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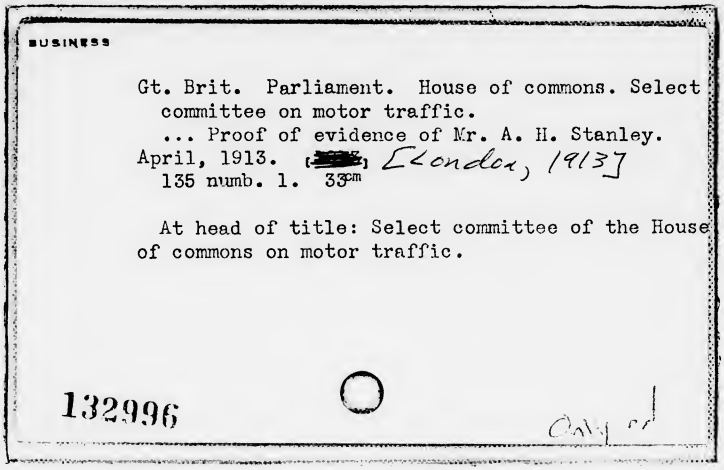
Great Britain. Parliament. House of Commons.

Proof of evidence of Mr. A.H. Stanley...

[London]

[1913]



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... Proof of evidence of Mr. A. H. Stanley.
April, 1913. [London, 1913]
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Richard W. Meade.

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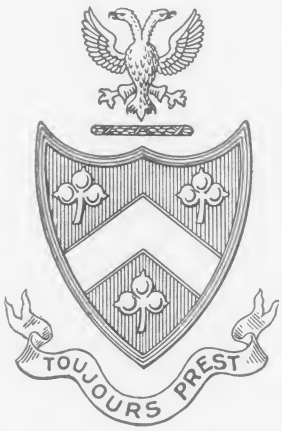


R. W. Meade

SELECT COMMITTEE
OF THE
HOUSE OF COMMONS
ON MOTOR TRAFFIC.

PROOF OF EVIDENCE

OF

MR. A. H. STANLEY.

APRIL, 1913.

Mr. A. H. STANLEY.

NOTE ON QUALIFICATIONS OF WITNESS.

Managing Director of the London General Omnibus Company, Limited, on whose behalf witness appears.

Also Managing Director of the District and London Electric Railways, and of the City and South London Railway.

Also Director of the Central London Railway, the London United Tramways Company, Limited, and the London and Suburban Traction Company, Limited.

Prior to his appointment in London, the witness had experience of street tramways in America, and in particular with the Public Service Corporation of New Jersey.

Certain evidence included in this proof is of a technical character relating to the mechanical details of the motor-bus or to engineering questions. Upon this part of the proof the Committee may wish to hear the Chief Engineer of the London General Omnibus Company, Mr. W. J. Iden.

INTRODUCTORY.

The evidence to be offered falls into five parts.

The first part deals with the position of the London General Omnibus Company, and its associated companies in connection with the general problem of London traffic.

The second part sets out more particularly the facts relating to fatal accidents which is the immediate question before the Committee and indicates the conclusions which may be drawn from those facts.

The third, fourth and fifth parts answer in a connected way the questions that have arisen in connection with the maintenance and operation of motor-bus services. Part three deals with questions affecting the staff, part four with questions affecting the motor-bus, and part five with questions affecting the traffic operation.

Any further information which the Committee may desire, the London General Omnibus Company will be pleased to supply in so far as they are able.

PART I.

The Present Position of the London General Omnibus Company, and its Associated Companies in Relation to the General Problem of London Traffic.

I.—The London General Omnibus Company.

Historical Retrospect, 1855–1913.

Foundation of the Company.

The London General Omnibus Company was founded in Paris in 1855, and first commenced work on its own account in London in 1858. In this year it ran an average number of 450 horse-buses each day. In 1859 it became registered in England as a limited liability company.

The period of horse traction.

The fortunes of the Company were most meagre until the year 1862. In this year it carried 42,768,248 passengers, at an average fare of over 3¾d., and was then working 602 horse-buses as a daily average.

From this point, with some fluctuation, the Company grew in importance until in 1905 it reached its maximum fleet of buses in daily working under horse conditions. The number was then 1,418, and this same year established the record for the number of passengers carried—217,012,090. The average receipt per passenger had by this time fallen to 1·37d. In the previous year the gross receipts from passengers reached their maximum with £1,261,637. The other important Company engaged in this business, the London Road Car Company, which was constituted in 1880, reached its maximum fleet about the same period. In 1904 the daily number of horse-omnibuses worked by it was 464. The maximum traffic was reached in the preceding year, 1903, when the number of passengers carried was 73,134,260, and the gross traffic receipts £405,597.

Co-ordination of services under horse traction.

During the whole of the horse-bus period there were numerous small owners of buses who appeared upon the streets. In practice it was found necessary to come to some arrangement with them to ensure harmony and unison in working. In this way various associations of owners were formed, and in the development of these associations the London General Omnibus Company took an active part.

The advent of the motor-bus.

The year 1906 marked the end of the Company's prosperity. Two causes contributed to this decline,—chiefly the introduction of the motor-bus, and in a less degree the development in the Underground system of railways which then took place and caused traffic to be drained off the streets.

The first motor-bus services.

From the Police records it appears that the first motor-bus to receive a licence as a public stage carriage was an electrically driven vehicle in the year 1897, which ran between Victoria and Charing Cross. The next service was between Putney and Piccadilly in 1899. This was worked by steam motor-buses. The first motor-bus, of a type approximating to that which has been subsequently developed, to run a regular service was a steam car, which ran in the Bayswater Road in 1902, under the auspices of the London Road Car Company.

About this time the London General Omnibus Company also took up the new form of locomotion although it was not until 1904 that it first ran a motor vehicle in public service. This was of an experimental type, and the first effective motor-bus of its ownership commenced work in October of that year. From this point, they proceeded to substitute motor-buses for horse-buses, and by withdrawals to reduce the number of this latter kind of bus on the streets, though the rate of substitution was not very rapid at first.

The London Road Car Company definitely adopted the policy of substituting motor for horse vehicles in the public service and took more rapid steps. In 1905 the London Vanguard Company was formed, and commenced to run wholly motor vehicles, and in 1906 the Great Eastern Motor Omnibus Company followed.

The amalgamation of motor-bus interests.

In the early part of 1908, the competition of the several companies working motor-buses had become so intense, and had led to such unsatisfactory features in working as the duplication of routes and the racing and nursing of rival buses, reflected in a series of collisions between the buses that then took place. For instance, all four companies had services between Charing Cross and Barking through the Strand, Whitechapel, Mile End, Stratford and Romford Roads and between Marble Arch and the Bank through Oxford Street, Holborn and Cheapside. The desirability of some arrangement was apparent on all hands. At this time negotiations were opened for the amalgamation of the London General Omnibus Company, with the Vanguard and Road Car Companies. These amalgamations were carried through in the latter half of that year.

Immediately preceding the amalgamation, the number of omnibuses run by the constituent Companies was as follows :—

	Horse.	Motor.	Total.
London General Omnibus Company ...	991	233	1,224
London Road Car Company	222	195	417
Vanguard Motor-bus Company	—	242	242

The losses on working were stated to have amounted to more than a quarter of a million.

On the 1st January, 1911, the Great Eastern Omnibus Company was absorbed into the one Company.

Improvements in motor-bus design.

During the period preceding this final amalgamation, great improvements had been made in the design of motor omnibuses, particularly in the direction of increasing their reliability and efficiency. The first motor-buses were all built by private manufacturers and all kinds of types were tried in service. By this means the owning companies gained considerable experience as to the requirements and how best they were to be met. To avail themselves of this experience the London General Omnibus Company commenced the manufacture of its own vehicles in 1909 and developed a type of bus which proved successful in the work of the streets.

The last horse-bus was withdrawn from the streets on 25th October, 1911. The Company had definitely carried through a policy of substitution and development.

The policy of development and co-operation.

With the disappearance of the horse-bus, there have been two lines of policy adopted and carried into effect.

The development of extra-London.

First, the services have been extended with a view to effectively and adequately providing for the traffic in the whole area of London and extra-London.

Comparing the census figures for 1901 and 1911, the population of London has declined from 4,536,267 persons to 4,521,685 persons or ·3 per cent. Allowing for the expected increase in population which should have accrued, it is calculated that in this decade there was a migration from London of 550,801 persons. In this same period, the population of extra-London has increased from 2,045,135 persons to 2,729,673 persons or 33·5 per cent. That is to say, the incidence of the traffic is shifting from the County of London to the areas that border upon it.

It is, therefore, urgent now and, with time, becomes more urgent to provide adequate transit facilities for the London that is growing up outside. This the motor-bus does. And by reason of the freedom with which it is worked, it is able to secure a more equable development on all sides at once than was the case with railways and other restricted forms of transit.

Secondly, so far as reasonably possible, arrangements have been made whereby the smaller companies running motor-buses and even horse-buses have been brought within one organization.

Co-operation with the smaller omnibus companies.

Working agreements have been entered into with the following companies :—

Metropolitan Steam Omnibus Co.
Tramways (M.E.T.) Omnibus Co.
British Automobile Traction Co.
New Central Omnibus Co.
Associated Omnibus Co.
Messrs. Tillings.

In entering into these agreements the Company recognised the objections, which might arise, to a conflict in the streets. An owner of few buses would wish to work them upon the most profitable section of roadway, and that would appear to him always to be in one of the main streets or lines of communication in the centre of the Metropolis. This is actually what occurred. Most of the motor-buses owned by the smaller companies ran on short services across the centre, as between Camden Town and Camberwell Green, or worse, Liverpool Street and Victoria or King's Cross and Victoria. These services occupied the central streets with motor-buses that did not perform any service for the people of London as a whole, and, as a result of the agreements referred to above, they have been withdrawn in favour of longer routes, which give some decisive and needed service.

Objections to a conflict of traffic interests.

Ill-considered routes and duplicate working.

One reason for this practice was the fact that only by confining the few buses owned to a short central route could they be made to give an appreciable service. A diagram has been prepared to show for three points the composition of the motor-bus services which pass through them, and to illustrate the much greater effectiveness of those provided by the London General Omnibus Company in contrast with those supplied by other owners. (Exhibit A.) With a close and effective service there is less temptation to fall into the evils set out in the succeeding paragraphs, and particularly to that described as hanging on points.

This is an abuse of a regular stopping point. It is important to a free flow of traffic that a bus should set down and pick up its passengers as quickly as possible and then get away. A reasonable time for this purpose would be less than 30 seconds, except at

Hanging on the point, an abuse.

crowded points in the busy hours. Tests taken at Charing Cross show that of the London General Omnibus Company's motor-buses 65 per cent. stopped for a period less than 30 seconds, and only 35 per cent. for a longer period, while of other companies' motor-buses only 40 per cent. stopped under 30 seconds, and 60 per cent. stopped longer periods, 10 per cent. of which exceeded the minute. The explanation of this is that the other motor-bus companies endeavour to linger at the point as long as possible to drain off as many passengers as possible, for the infrequency of their services does not cause such conduct as this to prejudice the takings of the following bus. On the other hand, with a really frequent service it would be against good policy to allow a bus to linger at a point, as the transfer of earnings from one bus to another would leave the final revenue unaltered. Another evil which was prevalent formerly but is of extremely rare occurrence to-day is the obstruction of the other traffic of the street. Where motor-buses of different ownership are proceeding, the one behind the other, and the first is required to stop to pick up or set down a passenger, instead of pulling in to the kerb it will stop sufficiently far from the kerb as to prevent the free passage of the following bus, except by the occupation of the offside of the roadway. By this procedure, it succeeds in retaining the leading position.

The obstruction of other traffic of the streets.

To secure this leading position gives rise to the practice of racing, and the effort to secure passengers gives rise to the objectionable practice of touting.

The divided ownership of a homogeneous class of vehicles plying for hire in the public streets gets reflected in these among other disorderly practices, and although much may be done by severe discipline to suppress these practices the only sane way is to remove the source of them in the natural combativeness of the human animal when interests are divided. The London General Omnibus Company can claim to have largely removed from the streets this one element of danger, as a result of their conciliatory policy towards the small owners.

Other abuses.

Another aspect of the policy of co-operation turns upon the relationship between the motor-buses and the Underground railways. Services of motor-buses now run in connection with and supplemental to the railway services as between Finsbury Park and Clapton or

Railway and Motor-bus co-operation.

between South Kensington and Clapham Junction. On some services through tickets are issued as between the motor-bus service from Highgate to Muswell Hill and the Hampstead line of the London Electric Railway. Particularly is this new policy marked in the provision of Sunday and holiday services. From the railway stations at Hounslow there are services to Windsor and Staines, or from the railway station at Golders Green there are services to St. Albans and Hatfield. The combination of feeder bus routes with underground trunk lines must be particularly happy as helping to solve the traffic problem of the outer London area.

II.—The Growth of Traffic in London. The London General Omnibus Company's Share in this Growth.

Growth of the habit of travel.

The growth of traffic in London has been exceedingly great. The Board of Trade (London Traffic Branch) in the report issued in the year 1912 gives a table which shows this phenomenon up to the year 1911. The figures for the year 1912 have been added from our own records.

Year.	Passenger Journeys.	Population.	Journeys per head.
1903	972,465,682	6,710,272	145
1904	1,019,417,803	6,775,645	150
1905	1,073,662,230	6,841,651	157
1906	1,129,784,965	6,908,298	163
1907	1,275,979,458	6,975,593	183
1908	1,375,675,429	7,043,540	195
1909	1,408,883,518	7,112,145	198
1910	1,566,277,272	7,181,415	218
1911	1,658,947,013	7,251,358	229
1912	1,742,219,367	7,318,353	238

Not only are there more people year by year to travel, but the people travel more often. Over the ten years given above, the average number of journeys each person makes has gone up by 64 per cent.

Growth of street traffic.

This growth of traffic may be analysed into that borne by the streets and that borne by the railways.

This is illustrated by the table following:—

Year.	Tram and Bus Passengers.	Standardized.	Per cent. of Total.
1903	681,743,002	100	70.
1904	720,779,053	106	71.
1905	768,609,735	113	72.
1906	800,263,317	117	71.
1907	919,745,792	135	72.
1908	976,009,090	143	71.
1909	998,138,908	146	71.
1910	1,141,005,311	167	73.
1911	1,222,448,228	179	74.
1912	1,304,710,168	191	75.

It shows that the street traffic has almost doubled in the course of the ten years under review and the rate of growth has been most marked during the last three years, for these account for roughly half of it.

It also shows that the opening of the newer underground lines in 1906-7 served to keep the balance between rail and street traffic almost even at about 71 per cent., but in these last three years the balance has tipped in favour of street traffic, for its share of the whole has gone up to 75 per cent.

The growth occasioned by the motor-bus developments.

The explanation of these figures for the last three years is the rise in popularity of the motor-bus. From 1903-1909 the bus share of the street traffic declined from 42 to 31 per cent. This covers the period of the development and electrification of the tramways and it covers also the experimental stage of the motor-bus. Then from 1910 onwards the motor-bus share has been steadily increasing, until in this year it seems probable that it will become the principal participant.

The results for the London General Omnibus Company, for these three years, will illustrate the extraordinary development which has taken place.

	1910.	1911.	Increase per cent. over 1910.	1912.	Increase per cent. over 1910.
Number of motor-buses employed	863	1,494	73.	2,319	169.
Number of passengers carried	232,102,604	340,669,411	47.	492,858,934	112.
Passenger receipts £ ...	1,629,671	1,963,779	20.	2,715,556	66.
Average receipt per passenger d.	1·67	1·38		1·32	
Miles of roadway covered by motor-bus services, June 30th	106	131	24.	195	84.

In March, 1913, to complete the comparison, the number of motor-buses employed was 2,750, or an increase of 219 per cent. over 1910, and the miles of roadway covered 348, or an increase of 229 per cent. over 1910. The average daily number of passengers carried in 1910 was 635,897, and in 1913 to date 1,588,822, or an increase of 150 per cent.

These figures show three interesting results :—

The motor-bus development justified by results.

1. That the development of traffic has kept pace with the increase in the number of motor-buses working. The

percentages of increase on each of these figures are closely similar, if allowance be made for the fact that the increase in the number of motor-buses employed occurs gradually over the course of the year. This shows further that an increase in the number of motor-buses was justified by public requirements and necessary to satisfy the public needs, and that there has been no undue attempt on the part of the motor-bus companies to overdo the situation.

2. That the increase in the number of motor-buses at work has corresponded to an increased mileage in the streets covered. This shows further that the motor-buses have been applied in giving facilities to districts which were in need of them and not in creating additional congestion in streets already provided with services.

For example, the jump in mileage between 1912 and 1913 is due to the introduction of services to such outlying points as Windsor, Staines, St. Albans, Romford, and Kingston, and to the systematic pushing out to further points of many services working in and out of central London. It includes new services to Merton and Streatham in south London, and between Leyton and Poplar, and Poplar and Plumstead on the extreme east side.

3. That the average receipt per passenger has declined. That is, travelling has become more cheap, for there is no reason to suppose that there has been any reduction in the length of journey taken.

The motor-bus has become an essential factor in any solution of the traffic problem of London. Reference may be made to the map which is included among the exhibits (Exhibit B) to show the extent and intricacy of the routes worked during the month of March in this year.

III.—The Development of the Motor-Bus.

Historical Survey.

The earlier types of motor-bus.

The motor-bus commenced to run on the streets of London in 1897. From the first type of motor-bus employed by the Companies now associated together as the London General Omnibus Company Limited down to the present "B" type there have been no less than thirty-two kinds.

The earlier types were purchased, and of these two have been petrol-electric, four have been steam, and twenty-four have been petrol driven engines.

Tendencies in design.

The improvements in design which followed one another through these various types had certain main tendencies, which chiefly arose from the influence exerted by the Police.

As to weight.

First—The weight of the earlier buses reached close upon 5 tons empty, the limit fixed by the Heavy Motor Car Order, but this was reduced from time to time until it became practicable to enforce the Police Regulation of August 1909 fixing the maximum unladen weight of the motor-bus at 3 tons 10 cwt.

As to noiselessness in working.

Secondly—The tendency has been markedly in the direction of securing noiselessness in working. The first bus had steel tyres. Quite early the resilient tyre of solid rubber was adopted, and is now in effect a statutory requirement. The majority of the earlier buses were driven by roller chains like those used on bicycles. For these, chains of the inverted dog tooth type were substituted to ensure silence in running. Then ball bearings have been fitted throughout the bus, except for the road wheels.

Mechanical improvements.

Besides all this, there were naturally improvements in the mechanical construction of the engine, such as the introduction of forced or automatic lubrication by means of a small oil pump fitted on the engine in place of the hand pump left to the discretion of the driver, or the substitution of tubular radiators for the leaky honeycomb variety, or the adoption of a thermo-syphon water circulation.

The greater stringency of Police Regulations.

During the period of development, the requirements of the police became more and more stringent, and in particular the standard of noiselessness set up occasioned considerable hardship on the various manufacturers of motor-buses, so much so that it was difficult to obtain motor-buses to work. During the same period, the London General Omnibus Company had acquired considerable experience from the working of so many types, an experience collected together in its hands but scattered among the manufacturers, and it felt competent to undertake successfully the construction of motor-buses on its own account more surely capable of complying with the requirements.

The building of motor-buses by the L.G.O. Co.

The first type of bus to be designed by the Company was the "X" type. This was of a lighter chassis than any previous pattern, and instead of a chain or rack for driving, it was driven through worm gearing on a live axle and a spur-driven gear box. The first bus of this type after many presentations was licensed on 16th December, 1909. The second on the 24th December, and the third not until 11th March, 1910. The delay was occasioned by a re-design of the gear box, as the previous one did not ultimately satisfy the police. Eventually the chain-driven gear box was proved to be the best and most silent, and was adopted for all buses.

The Company's engineers were not contented with the "X" type, and proceeded to design and build the "B" type. This comprises a petrol-driven engine working through a chain-driven gear box to a live back axle fitted with worm gearing. The first bus of this type to be licensed was on 18th October, 1910. Since that date up to March, 31st, 1913, 2,480 have been manufactured. This, therefore, is the dominant type of motor-bus upon the streets.

List of improvemenst executed in the "B" type chassis.

Although the "B" type was commenced as recently as 1910, it has not been stationary. A list of some improvements carried out in the construction shows that care is constantly given to any details of the design which seem open to improvement.

1. The sheet-iron oil tray was replaced by aluminium oil trays cast on to the casing of the engine and gear box. These trays were to prevent leakage of oil on to the roadway. The new arrangement prevents the rattle caused by looseness under the old arrangement.

2. The wooden road wheels were abandoned in favour of cast steel wheels. The first had straight spokes. Later a fork-ended or "Y" spoke was adopted for the rear wheels because it proved to be stronger for the weight. Later still a hollow steel wheel spoke was considered as superior to the "Y" form.

3. The front and back cardan shafts were altered from drawn tubing to solid high tensile steel shafting.

4. A reduction was made in the amount of the projection of the hubs.

5. A reduction in weight of the frame brackets, dumb irons and other parts of the chassis was gained by the adoption of newer and better methods of production.

6. A lighter design of piston was introduced to diminish vibration of the engine.

7. Cylinders having larger water spaces and reduced weight were fitted.

8. New pattern steering rod ends tending to greater reliability and quietness were fitted.

9. The pitch of the second speed chain of the gear box was altered.

10. The hardened sleeve on the axle tube was extended into the axle casing to add to the strength at this point.

Efforts towards the perfecting of the motor-bus.

The object of this recital of facts is to show that there has been no neglect either on the part of the Company to provide as perfect a bus as it is possible to obtain or on the part of the licensing authority in insisting upon the improvements which suggested themselves to it.

The improvements, which have been set out, have tended either towards increasing the strength and corresponding safety of the motor-bus as a vehicle or towards increasing the noiselessness. There are those who point to the present noiselessness in working as

being a source of danger. That is, the absence of any characteristic sound on its approach misleads people as to its imminence.

Lastly, these improvements have contributed to provide a most reliable type of vehicle for the public service, and it is this reliability which has given such impetus to the growth of motor-bus traffic in these last three years and made of it the successful vehicle which it now proves itself to be.

IV.—The Newness of the Motor-bus.

Novelty as a source of accident.

This, in the opinion of the witness, is one of the most important points in connection with this question of accident which can be made in favour of the motor-bus. That which is new is that which finds us inexperienced, and quite a number of the lamentable accidents that have been occasioned by the motor-bus are to be attributed to this quality of novelty operating in divers ways.

He is not alone in this opinion. Mr. Fell in his evidence expressed a similar opinion.

The suddenness with which the motor-bus has become a familiar object has tended to deceive us as to its newness. It requires statistics to remind us of this.

The novelty of the motor-bus.

First there comes the police record of the number licensed. By placing the number of horse-buses alongside, we can see the point at which the substitution of new for old became really effective.

Year.	Motor-Omnibuses.	Horse Omnibuses.
1897	1	3,190
1898	—	3,423
1899	5	3,626
1900	4	3,681
1901	10	3,736
1902	33	3,667
1903	14	3,623
1904	31	3,551
1905	241	3,484
1906	783	2,964
1907	1,205	2,557
1908	1,133	2,155
1909	1,180	1,771
1910	1,200	1,103
1911	1,962‡	786
1912	2,908	376

‡ The silent B. type introduced in this year.

The number of omnibuses licensed must not be regarded as an accurate criterion of the work performed. One feature, which marks the transition from horse to motor traction, has been the increased daily mileage run by the bus. In the horse days, the average daily mileage was about 63; for motor-buses, the average has been added to until it stands at 114. Taking the year 1901 in the table, when the number of horse-buses licensed reached a maximum, the aggregate daily mileage would be 235,368. In 1913, the aggregate daily mileage would be 355,200 or an increase of 51 per cent., although the vehicles employed are 462 fewer in number.

The novelty of the new drivers.

Secondly, there comes the number of motor drivers employed in each year, but, owing to the mixed character of the services in the early years, these figures have to be confined to the last two years. They show :—

Date.		Number of motor-bus drivers employed.
January 1st, 1911		1,856
Number engaged	668	
Number quitting the service ...	235	
Net gain	433	
July 1st, 1911		2,289
Number engaged	590	
Number quitting the service ...	266	
Net gain	324	
January 1st, 1912		2,613
Number engaged	778	
Number quitting the service ...	308	
Net gain	470	
July 1st, 1912		3,083
Number engaged	1,005	
Number quitting the service ...	254	
Net gain	751	
December 31st, 1912		3,834

It may be added that the wastage shown in the above table mostly occurs in connection with the more recently employed men. It is not therefore correct to regard the employment of a motor-bus driver as anything but a fixed employment when once a man has

settled into it. Men have not continually to be engaged and trained for the purpose of renewals and to maintain the establishment of the staff.

The system under which the grade of drivers was first divided into classes according to length of service was completed in May, 1912. These initial figures may be compared with the figures for December 31st, 1912:—

	1912. May 22nd.	Per cent. of Total.	December 31st.	Per cent. of Total.
1st Class with Bonus (over 2 years' service)	1,414	51	1,520	40
1st Class (over 1 year)	535	20	684	18
2nd Class (over 6 months)	405	14	818	21
3rd Class (under 6 months)	411	15	812	21
	2,765	100	3,834	100

It is apparent that over so short a period the higher classes must remain comparatively stationary, and that the gain in numbers must fall to the lower classes. The shift in relative percentage is marked.

The novelty of the routes covered.

Thirdly, there comes the miles of roadway covered. The motor-bus routes have been charted and figures obtained for a period of five years, with this result:—

Date.		Mileage of Roadway worked.	Standardized.
1907.	June ...	51 ...	100
	December ...	41 ...	80
1908.	June ...	46 ...	90
	December ...	96 ...	188
1909.	June ...	140 ...	275
	December ...	108 ...	212
1910.	June ...	106 ...	208
	December ...	104 ...	204
1911.	June ...	131 ...	257
	December ...	156 ...	306
1912.	June ...	195 ...	382
	December ...	329* ...	645

* An explanation of this extraordinary increase is given in Part I., Section 2.

The greatest advance has taken place in the most recent period, and in fact the mileage was practically stationary over the earlier periods, as the increase in 1908-9 was due to an amalgamation of companies.

The relative merit or demerit of the accident record.

With machines that are relatively new, and which present a difficult problem for judgment both as to speed and to ease of movement to the person in the street; with staff which, while carefully trained, are not familiarized in the sense of having grown up with the new machines; and with roads covered with services which had not previously been worked, so that the traffic conditions of those roads could be memorised and known, the record of accident of the motor-bus is capable of some excuse. It seems safe to venture a prophecy that the record will of itself improve to a beneficial extent as the newness wears off and traffic conditions settle down. It already is an improving one, as the figures set forth later show. (See Part II., Table I).

Such a sequence of facts is not unique; when street cars were introduced into American cities first of all the number of accidents was alarming, but in time people became accustomed to their presence and the number of accidents fell off without any change in the tramways or tramway working.

Characteristics of motor traffic as distinguished from horse traffic.

Motor traffic differs from its predecessor horse traffic in almost every way. (1) In speed, for the horse had only limited possibilities. (2) In acceleration, which is a great confuser of judgment. (3) In brake capacity, which introduced a compensating advantage. But the chief difference is in appearance. The presence of the horses and the movement of the horses were things of which man had had generations of experience, which had been woven into the texture of the brain. He automatically avoided horses. He automatically judged the rate of their approach. Now they are gone. The motor-car has no visual indicator of its speed. The only element and a constantly changing one is the appearance of length in the roadway before it which is, as it were, consumed by the car. The avoidance of the motor propelled vehicle has not yet become automatic.

V.—General Traffic Considerations.

The consideration of safety seems to be implicated with several traffic considerations.

Area covered by motor-bus routes.

The area covered by motor-bus routes is a very wide one, and tends to become co-terminous with the area which really constitutes London as having one centre and one interest. It is an area which takes no cognizance of political or other artificial boundaries. The Metropolitan Police Area, which comprises the whole or part of five counties, is to be regarded as a single area for motor-bus operation. The routes, at the present day, extend into two further counties, making seven in all. This total area is parcelled out among 39 cities, county or municipal boroughs, 45 urban districts and 11 rural districts, so that there are altogether 95 local authorities concerned in their operations now. Almost every single route covers two or more of these local areas up to some eight or nine in the case of long routes.

The motor-bus routes of extra London.

The length of roadway covered by services of motor-buses was in March of this year as follows :—

	Route Mileage.				
March, 1913.	Within the County of London.	Per cent. of Total.	Without the County of London.	Per cent. of Total.	Total.
Weekday ...	216	62	135	38	351
Sunday ...	211	51	199	49	410

Or this point may be illustrated another way. Of the routes in operation on a weekday only 27 out of 73 are wholly confined within the borders of the administrative county of London, that is 37 per cent. The remaining 63 per cent. cross the borders into the adjacent counties.

The London General Omnibus Company is providing services of motor-buses for the newer suburbs springing up on the fringe of London. Some of these services, or more correctly some of the extended sections of these routes, are being worked at unremunerative rates of earning, and are of a pioneer character, helping in the development of a territory which may prove to be a remunerative field of endeavour in the future. The London General Omnibus Company is also providing services of motor-buses into the country which are of great benefit in affording opportunity for healthy recreation and change of air. These are run at comparatively cheap rates of fare.

The motor-bus routes of the central London area.

The congested central area of London depends upon the motor-bus for its surface transport facilities almost entirely. Having regard to the lay-out and width of the streets and to the volume of traffic which they have to bear, it is generally recognised that the motor-bus on account of its accommodating character is the most satisfactory type of vehicle.

Motor-bus and tram routes compared.

There is not a single route worked by motor-buses which exactly parallels a tramway route and affords no new facility. In every case the motor-bus route either links up districts not served by a through tramcar service or overlaps the tramway route at its inner or outer ends or both.

The overlapping of tramway terminals.

It is not a practicable proposal to work motor-buses in such a manner that they should not overlap a tramway route. At the termini of the tramway routes on the border of the inner zone of London to transfer the passengers from the one to the other system of traction would render the street impassable with the numbers of people and the turning back of two sets of vehicles. Observations have been taken at two points to illustrate that the flow of traffic is across these terminals. For instance, at Aldgate Church, in two hours in the morning, 123 motor-buses passed into the City each with an average load of 20 passengers, 71 per cent. of whom came from beyond on the tramway area, and 29 per cent. joined at the tramway terminus, chiefly to complete their journey. At Hampstead Road corresponding figures show that 71 motor-buses passed into the Tottenham Court Road with an average load of 24 passengers, of whom 77 per cent. came from beyond, and 23 per cent. joined chiefly to complete their journey.

Photographs which give the two sides of the tramway picture, the long string of cars filling up the tracks and the long queue of intending passengers, more vividly indicate the real meaning of the figures given in this paragraph. (Exhibit C.)

Outlying routes not remunerative in themselves.

Nor is it practicable to work motor-buses in such a way as to act purely as feeders to tramway routes at their outward extremities. In the first place the necessity to change cars is a deterrent to the free flow of traffic. In the second place feeder routes of this kind, working solely in thinly populated country, cannot be profitable they only become profitable when they contribute traffic to a longer

and more frequented passenger route. Further observations have been taken to show the flow of traffic across the outer terminals of the tramway system. For instance, at Ilford Broadway where there is a break in the system due to a change of ownership in the tramways, motor-buses in three hours carried in one direction 559 passengers across the break, 441 of whom were through passengers, and in the same period of time carried in the opposite direction 896 passengers of whom 818 were through. At the Green Man, Leytonstone, the proportion of through passengers passing the tram terminus was 77½ per cent.

To illustrate the provinces now exclusively worked by the tramcar and the motor-bus, and the province which they necessarily share if the routes are to be consistently worked in the interest of the public, a map diagram has been prepared and included among the exhibits. (Exhibit D.)

Need of services supplementary to the tramway services.

It is the opinion of the witness that the tramway system is not capable of carrying all the traffic of the streets without the assistance of the motor-bus system. The volume of traffic which can be operated over a set of tramway lines, is limited by the volume which can be carried at the decisive point. Such a decisive point is Westminster Bridge. Over this bridge pass 13 different services to such places as Woolwich, Peckham, Dulwich, Norbury, Norwood, Tooting, Merton, and Wandsworth. Statistics show that this is the heaviest tram service of any point in London. Yet at one of the busiest hours of the evening, viz., 6.0 p.m.—7.0 p.m., the seats provided by the tramcar services over the bridge south bound amounted to 7,722, of which 6,920 were occupied. In the same hour the motor-bus service over the bridge carried 2,278 passengers or a surplus of 1,476 over the full seating capacity of the tramway service. Again in the Commercial Road, E., between 7.30 a.m. and 9 a.m. the same result obtains with regard to the inward traffic. The seating capacity of the tramcar services was 4,504, of which 4,098 seats were occupied. In the same period the motor-bus services carried 1,403 passengers or a surplus of 997 over the full seating capacity of the tramway service. Upon the same road similar conditions prevailed over a period of 3½ hours from 6 p.m. to 9.30 p.m., the surplus of passengers over the full capacity of the tramway service being 1,636. These examples illustrate this point of the need of some service auxiliary at least to the tram service.

The densest service in connection with the tramways is at Westminster Bridge, but this is in the nature of a terminal point upon which, as set out above, many roads converge. The London Road, S.E., is a better example, and the maximum number of trams in one direction at the busiest hour is 166 carrying 10,079 passengers. The number of motor buses required for this load would be 297, which is little in excess of the number at the Marble Arch (261), or between Bond Street and Oxford Circus (235). The London Road is 41 feet in width.

The ability of the motor-bus to lift the tramway traffic.

The results dealt with in the preceding paragraph assume that the tramway service loads to its full capacity. This is very far from the reality. Assuming that the average distance a passenger travels by tram or by bus does not vary, by dividing the miles run into the number of passengers carried, one can determine the relative load which each class of vehicle carried. The figures show that the average number of passengers per mile on the tram was about 10·5 and on the motor-bus about 8. These figures need to be brought into relation with the seating capacity of the respective vehicles. A tramcar seats 78 passengers; a motor-bus only 34. The relative efficiency of the motor-bus to the tramcar is almost as 2 is to 1.

Relative efficiency of the seating capacity of a tramcar and a motor-bus.

In order to accommodate the same number of passengers, it is admitted that more motor-buses than tramcars would be required, but the effect which the additional vehicles must have upon the user of the streets must, apart from the obvious fact of difference in size, be considered in relation to three other facts :—

Aspects of operation favourable to the motor-bus.

1. The fact just illustrated that the actual operating efficiency of the motor-bus is almost twice that of the tramcar.

2. The fact that the motor-bus distributes itself over many streets, which, in addition to spreading the flow of traffic into many channels, provides a greater public convenience.

3. The fact that, as shown in the Report of the London Traffic Branch of the Board of Trade in 1912, at page 36, the comparative speed of the motor-bus and the tramcar favours the motor-bus, due to their less frequent stops and their greater freedom of movement which prevents their impeding one another.

The heaviest point in London for motor-bus services is at the Marble Arch, between the Edgware Road and Park Lane. The

total number of motor-buses passing in one direction in the busiest hour is 261, with 8,874 seats. So far as the witness knows the working of the street at this point is satisfactory.

The efficiency of a vehicle engaged in dealing with the passenger traffic of London streets turns on a great many factors. There is not only the seating capacity, but the extent to which that seating capacity is put to use. There is not only the speed of working, but the accommodation which can be afforded to the other traffic of the street. Finally, the motor-bus is an independent and self-contained traffic unit capable of movement wherever it may require or be required to go at any time and under any circumstances.

Priority in time of different forms of passenger transit.

Another question upon which comment has from time to time been made is the priority of the various forms of transit in the street. The common order has been :—

Horsed public carriages.
Horsed omnibuses.
Horsed trams.
Electric trams.
Motor-buses.

But from a search in the old records of the Company there are exceptions of all kinds. For instance, the motor-buses were working in the Fulham Palace Road, the roads between Brixton and Herne Hill, the Finchley Road to North Finchley, the Battersea Bridge Road, and the roads between Acton and Hanwell, and the St. George's Road, S.E., before the tramways came into the road at all, and there are several of the main roads of London now fully occupied by motor-buses, such as the Edgware Road and the Finchley Road, into which it is sought to introduce trams. There has been as much almost of disturbance of motor-buses by trams as of trams by motor-buses, and both have ruthlessly supplanted the horse-bus.

The motor-bus as successor in title to the horse-bus.

The point has not so far been emphasised before this Committee that the motor-bus is the only legitimate successor of the horse-bus, and that the horse-bus was withdrawn in its favour after a career of great usefulness when it alone was engaged in the public service. The Company is still the same, the organisation is the same ; the only change is in the method of locomotion.

Objection has been taken to the motor-buses running alongside the trams, but the bus has the prior right. Objection has been taken to tram and bus stopping at the same points, but the bus originally fixed those points and established their reputation for traffic. Objection has been taken to some of the conditions attaching to motor-bus operation such as the hours of duty, but these date back to the horse-bus and were developed to meet the wishes of the men. Everywhere in dealing with the questions arising on the motor-bus one finds the vestiges of a lengthy history referring back to the horse-bus.

The break-up of streets and its effect on motor-bus operations.

The Report of the Royal Commission on London traffic in paragraph 172 of Volume I, at page 85, refers to the inconvenience caused by the breaking up of the public streets, and points out the magnitude of the number of authorities and companies that possess this power. This inconvenience is especially felt by the motor-bus companies. Some of the authorities give notice of their intention to break up the street, and if the period of dislocation is to be of much duration, arrangements are made for the temporary diversion of the routes. Other authorities, and particularly the companies empowered, give no such notice, and diversions can only be made haphazard when the circumstances become known. Irregular diversions of route not being covered by the time schedules and other details of operation, are apt to involve a greater risk of accident. They also call into sudden requisition bye-streets, where the presence of the motor-bus is unfamiliar.

In the week ending April 4th last, seven roads were entirely closed for repairs, involving the diversion of twelve motor-bus routes. Further, fifty-three roads were partially stopped for the following causes, viz :—

Road repairs	25
Tramways	9
Sewerage and drainage ...	6
Telephones	4
Gas	3
Electricity	3
Water	1
Hydraulic Power	1
Subway construction ...	1

On these fifty-three roads, the services of motor-buses were continued. The procedure in relation to such works as these might be improved by increased co-operation.

Other derangements of motor-bus routes.

Derangements of motor-bus routes are also occasioned by fires, demonstrations, processions and other events. In some cases the Police issue instructions with regard to them; in other cases the conveniences of operation suggest them. It is matter of comment that the motor-bus is able to meet these chances of the streets without being compelled to withdraw its services altogether, owing to its capacity to shift its course without difficulty from street to street.

The breakdown of a motor-bus does not have the effect of deranging the service. If it can be moved, it is usually shunted into a side street out of the way and left to be picked up by the garage lorry. Each garage has a lorry attached to it equipped with jacks and tackle capable of handling and clearing away a motor-bus. Except for the omission of the trips of the motor-bus falling out of action, the remainder of the service works on without interruption.

Finally, to illustrate the magnitude of the work now performed by the motor-buses, a complete catalogue of the routes worked is given in the following table, with particulars of the number of motor-buses employed.

Service No.	Route.	Length in Miles.	No. of Omnibuses required for service.		Remarks.
			Week-days.	Sun-days.	
1	Tower Bridge and Kilburn	7·40	32		
	Tower Bridge and Edgware	13·05		44	Saturday and Sunday extension
2	Ebury Bridge and Golder's Green ..	7·22	30		
	Ebury Bridge and North Finchley ...	11·00		36	Sunday extension
3	Brixton and Camden Town	6·95	23		Withdrawn on Sundays
3A	Charing Cross and Camden Town ...	2·70	5		Withdrawn on Sundays
4	Bermondsey and Finsbury Park ...	8 05	26	20	
5	Stroud Green and Putney	10 90	28		
	Stroud Green and Wimbledon	13·45		34	Sunday extension
6	Kensal Rise and South Finchley ...	10·05	40	42	
6A	Kilburn and Shoreditch	6·90	30		Withdrawn on Sundays
7	Liverpool Street and Wormwood Scrubbs	7·45	48	40	
8	Willesden and Old Ford	11·75	56	56	
9	Liverpool Street and Barnes	9·45	54	42	
10	Elephant and Castle and Wanstead ...	8·75	34	36	

Service No.	Route.	Length in Miles.	No. of Omnibuses required for service.		Remarks.
			Week days.	Sundays.	
11	Liverpool Street and Hammersmith ...	8·50	54		Withdrawn on Sundays
11A	Liverpool Street and Wormwood Scrubbs viâ Victoria	10·30	26	86	*See* No. 11A.
12	Peckham and Turnham Green	11·90	30	34	
13	Hendon and London Bridge	10·10	52		
	Hendon and Charing Cross	7·87		36	Sunday curtailment.
14	Hornsey Rise and Putney	10·65	30	28	
15	Putney Common and East Ham ...	15·15	60		
	Putney Common and Plaistow	13·11		62	Sunday curtailment.
16	Victoria and Cricklewood	5·44	56	64	
17	Ealing and London Bridge	10·30	45		
	Ealing and East Ham	16·90		51	Sunday alteration
18	London Bridge and Willesden	9·85	36	36	
19	Clapham Junction and Highbury Barn	8·85	58	54	
20	Shepherd's Bush and West Norwood ...	11·00	40	38	
21	Tunnel Avenue Greenwich and Wood Green	13·25	46	48	
22	Homerton and Putney	12·10	23		Withdrawn on Sundays.
23	Acton Vale and Barking	15·90	32		
	Marble Arch and Ripplesside	12·08		38	Sunday alteration.
24	Pimlico and Hampstead Heath ...	6·05	38	36	
25	Victoria and Seven Kings	13·80	77	66	
26	Kensal Rise and Hackney Wick ...	10·65	42	42	
27	Twickenham and Highgate	15·15	60	60	
28	Wandsworth Bridge and Golders Green	8·85	26	30	
29	Victoria and Southgate	11·05	46	60	A portion only of this service is extended to Hadley Woods on Sundays.
29A	Victoria and Cockfosters				

Service No.	Route.	Length in Miles.	No. of Omnibuses required for service.		Remarks.
			Week days.	Sun-days.	
30	Kings Cross and Putney	8·35	36		
	Kings Cross and Kingston	13·95		32	Sunday extension.
31	Chelsea and St. John's Wood	5·75	28	30	
32	Charing Cross and Ladbroke Grove ...	4·90	24		Withdrawn on Sundays.
33	East Sheen and Liverpool Street ...	11·20	50		
	East Sheen and Piccadilly Circus ...	8·47		18	Sunday curtailment.
34	Liverpool Street and Norwood	6·70	23		Withdrawn on Sundays.
35	Camberwell Green and Walthamstow (Crooked Billet)	11·10	52		
35A	Camberwell Green and Walthamstow (Wood Street)	11·10			
35	Camberwell Green and Chingford Mount	12·25		44	Sunday extension.
35A	Camberwell Green and Walthamstow (Wood Street)	11·10			
36	West Kilburn and Catford	12·90	26	26	
37	Herne Hill and Hounslow	13·60	48	50	
38	Victoria and Leyton	9·35	48		
	Victoria and Epping Forest (Warren Wood House)	14·10		54	Sunday extension.
39	Victoria and Sidcup	12·85	16	18	
40	Elephant and Castle and Upton Park ...	7·95	30	28	
41	Old Ford and Tufnell Park	8·05	20		Withdrawn on Sundays.
42	Finsbury Park and Tower of London ...	7·25	25	24	
43	London Bridge and Muswell Hill ...	8·60	28	28	
44	Highbury Station and Putney Common	10·30	34	32	
45	Clapham Common and St. John's Wood	9·80	34	30	
46	Victoria and Willesden	7·65	30	26	
48	Tottenham and Merton	15·35	48	36	
49	Shepherd's Bush and Streatham ...	9·80	24		
	Shepherd's Bush and Thornton Heath ...	13·05		36	Sunday extension.

Service No.	Route.	Length in miles	No. of Omnibuses required for Service.		Remarks.
			Week days.	Sun-days.	
50	Liverpool Street and Shepherd's Bush...	6·60	34		Withdrawn on Sundays.
59	Croydon and Oxford Circus	12·65	36		
	Croydon and Camden Town	14·40		60	Sunday extension.
62	Highgate and Waterloo	5·30	12		Withdrawn on Sundays.
65	Stoke Newington and Fulham	10·50	40	42	
66	Willesden and Tooting	11·30	26	26	
67	Walthamstow (Hoe Street) and Poplar...	6·90	10	10	
68	Tulse Hill and South Hampstead ...	9·70	40	36	
69	Plumstead and Poplar	5 80	18	20	
71	Surbiton and Ealing	11·60	18	26	
74	Camden Town and Barnes	7·70	14	14	
76	Victoria and Stoke Newington	6·75	20		Withdrawn on Sundays.
77	King's Cross and Earlsfield	9·30	30	26	
79	Kingston and Esher	4·00	2	2	
80	Ealing and Northfields	3·25	5	5	
81	Hounslow and Windsor...	12·85	6	16	
82	Heston, Hounslow and Staines... ...	6·70	3	6	
83	Golder's Green and Kilburn	6·60	12		
	Golder's Green and Edgware	5·95		12	Sunday alteration.
84	Golder's Green and St. Albans	15·90	7	16	
85	Putney Bridge and Roehampton ...	2·20	4		
	Putney Bridge and Kingston Hill ...	5·20		12	Sunday extension.
86	Barking and Barkingside (Beehive Lane)	3·10	5		
	Barking and Barkingside (Maypole Inn)	4·90		8	Sunday extension.

Service No.	Route.	Length in Miles.	No. of Omnibuses required for service.		Remarks.
			Week days.	Sun-days.	
87	Clapton and Colney Hatch Lane ...	8·40	16	20	
93	Mile End and Romford	11·15	14	14	
100	Stockwell and Whyteleafe	12·75		24	Special Sunday service
101	Somerset House and Hampton Court, viâ Putney	15·95		38	Special Sunday service
102	Charing Cross and Harrow Weald ...	13·70		24	Special Sunday service
103	Elephant and Castle and Buckhurst Hill	12·55		40	Special Sunday service
104	Somerset House and Hampton Court, viâ Kew	15·05		38	Special Sunday service
105	Kilburn and Watford	10·75		30	Special Sunday service
106	Oxford Circus and Petersham	10·10		28	Special Sunday service
108	Elephant and Castle and Epping Town	18·90		50	Special Sunday service
109	Golders Green and Hatfield	15·50		16	Special Sunday service

Total Number of Omnibuses required for Service on Weekdays... ...	2279
Total Number of Omnibuses required for Service on Sundays	2390
Additional for Sundays	111
Total Mileage of the Services on Weekdays	671
Total Mileage of the Services on Sundays	750
Extra on Sundays	79

PART II.

Fatal Accidents Attributed to Motor-Buses of the London General Omnibus Company, 1911–1912.

An Analysis of the Facts with some Conclusions.

Source of particulars analysed.

The facts as dealt with in the succeeding tables have been ascertained from a perusal of the notes of the inquest proceedings kept by the London General Omnibus Company which may be regarded as more impartial than the reports of the Company's own staff concerned.

In cases of doubt the Coroner's depositions have been obtained, and from them doubtful points have been cleared up so far as possible.

Fatal accidents occurring in connection with motor-buses of other companies worked by the London General Omnibus Company are included in the tables.

I.—Summary Table of the Fatal Accidents for 1911-1912-1913.

	1911.	1911.	1912.	1912.	1913*.	1913*.
No. of fatal accidents occurring in the streets	107	...	150	...	34	...
No. of motor-buses employed for every fatal accident occurring	...	13·9	...	15·5	...	20·2
No. of fatal accidents per million miles run by motor-buses	...	2·44	...	2·14	...	1·51
No. of fatal accidents per mile of roadway worked by motor-buses	...	·82	...	·77	...	·39
Miles run by motor-buses per mile of roadway worked	334,304		357,235		...	—
No. of fatal accidents occurring on or in connection with the rear platform of motor-buses	10	...	8	...	1	...
No. of fatal accidents to passengers per million passengers carried	...	·029	...	·016	...	·007
Total No. of fatal accidents	117	...	158	...	35	...
No. of millions of passengers carried for each fatal accident	...	2·9	...	3·1	...	4·0

* The 1913 figures relate to the three months ending March 31st. The statistics are adjusted for comparison.

Improvement in position with regard to fatal accidents measured statistically.

These statistics shew that having regard to the increased volume of work performed as measured in either of three ways the proportion of fatal accidents is not more but less. That is to say, that more motor-buses were in use, more miles were run, more streets were covered for each fatal accident in 1912 than was the case in 1911, and in 1913 than was the case in 1912.

The measure of passengers carried gives an equally decisive indication of the improvement which is taking place.

Diagram to illustrate TABLE 1 and to show the relative decline in the number of fatal accidents over the period 1911-2-3

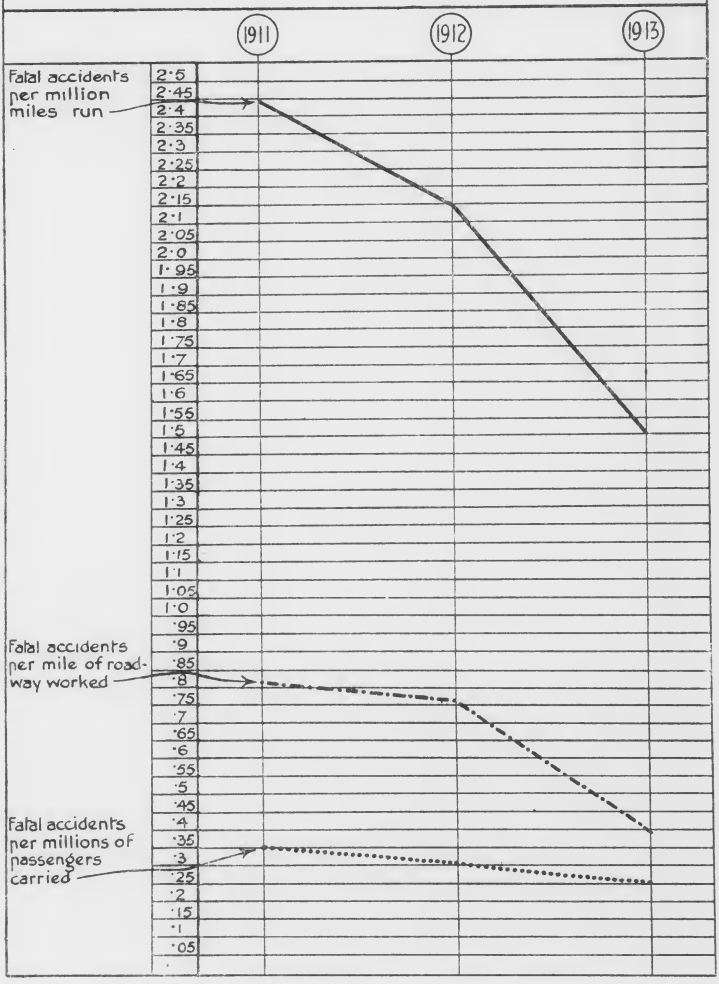
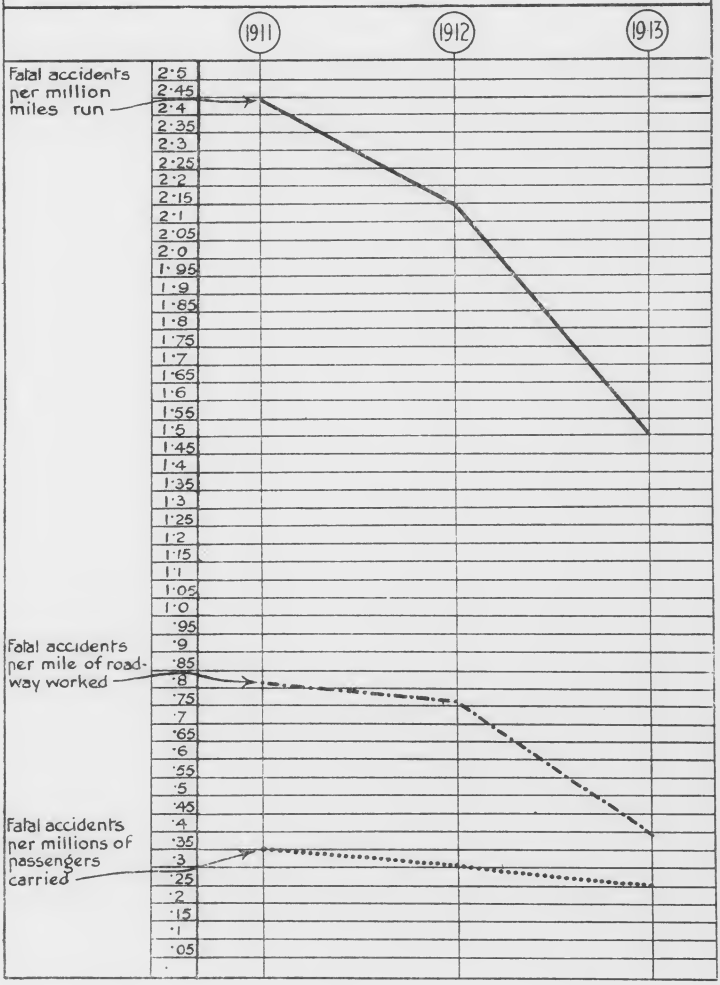


Diagram to illustrate TABLE 1 and to show the relative decline in the number of fatal accidents over the period 1911-2-3



II.—Table showing the Age, Sex and Condition of the Persons killed in 1911-1912.

	1911.			1912.		
	Males.	Females.	Total.	Males.	Females.	Total.
6 years of age and under ...	11	2	13	18	3	21
From 7 to 12 years of age inclusive ...	14	5	19	22	3	25
From 13 to 16 years of age inclusive	14	—	14	16	—	16
Total ...	39	7	46	56	6	62
From 17 to 60 years of age inclusive	38	13	51	54	22	76
61 years of age and over	10	5	15	9	11	20
Unascertained	4	1	5	—	—	—
Total ...	91	26	117	119	39	158

Unfitness for street conditions as a cause of accident.

It is apparent from these figures that 39 per cent. of the total number of persons killed in each year were of tender age and that 13 per cent. in each year were of such a mature age that it might reasonably be inferred that they were beset by the infirmities usually consequent thereto.

The figures are curiously proportionate in each year and account for 52 per cent. of the total.

Of the 48 per cent. of persons killed in each year who from their age might fairly be taken to be able-bodied and competent a further enquiry shows them to be afflicted as follows :—

	1911.	1912.
Insanity	2	2
Intoxication	8	4
Defective Vision	1	2
Deafness	—	1
Physical Unfitness	2	2
Total ...	13	11
Leaving as a final result able-bodied and competent persons ...	38	65
	51	76

These figures, it is submitted, are not complete, as at inquests the question of intoxication, where the circumstances are not patent, is not particularly pressed out of a respectful sentiment for the deceased.

It is recognised that there is a duty to exercise especial care on behalf of the young, the aged and the infirm, and that such figures as these afford no excuse in themselves As the law stands :—

" Persons on foot even if infirm have a right to be upon a " highway and are entitled to the exercise of reasonable care on the " part of persons driving vehicles upon it but they are not exempt

" from a duty to take care of themselves. The amount of care " reasonably to be required of them depends upon the usual and " actual state of the traffic and on the question whether the foot " passenger is at a recognised crossing or not."

Further it is suggested that the requirement of extra care on the part of the driver must depend upon his knowledge of the condition of the pedestrian. That is to say it can only arise when defect is apparent.

Nevertheless it is striking that so large a proportion of the fatal accidents occur to those who by nature or neglect are unfitted to the conditions pertaining to a busy street.

It is noticeable that only 12 per cent. of the children or young people killed are girls.

III.—Table showing the Occupation and Place of Residence of the persons killed 1911-1912.

Age.	1911.				1912.			
	16 and under.	17-60.	61 and over and unascertained	Total.	16 and under.	17-60.	61 and over.	Total.
Labouring classes ...	1	6	3	10	—	13	1	14
Artizan classes	—	10	1	11	—	14	2	16
Small shopkeepers and shop assistants	1	2	2	5	5	6	1	12
Servant class	—	4	—	4	—	8	—	8
Clerical class	4	—	—	4	3	5	—	8
Total	6	22	6	34	8	46	4	58
Employed in the streets—								
Newsmen and boys ...	—	—	—	—	1	1	1	3
Carmen and vanboys ...	2	3	—	5	—	2	1	3
Street musicians ...	—	—	1	1	—	2	—	2
Itinerant vendors ...	—	1	1	2	—	4	—	4
Drivers and attendants	—	8	2	10	—	1	—	1
Miscellaneous	—	1	—	1	—	1	—	1
Total	2	13	4	19	1	11	2	14
Miscellaneous	—	4	2	6	—	6	1	7
Unoccupied	39	12	7	58	53	13	13	79
Grand Total ...	47	51	19	117	62	76	20	158

Class incidence of fatal accidents.

The unoccupied persons are chiefly of the lower middle and labouring classes and that being so it is apparent that the fatal accidents occur to those persons who by a class predilection spend a considerable amount of their spare time in the streets. Except for those employed in the streets, the accidents seldom occur to those who are in the streets for purposes of business or for the definite purpose of moving from place to place for which the street is primarily intended.

The residence or place of business of all the persons killed was within the London area with the following exceptions—

1911.—Chilham, Kent. A woman collapsed and fell from a stationary bus.

1912.—Brooklyn U.S.A. A clergyman was knocked down by a bus at a busy corner in crossing the road diagonally regardless of the refuges provided for pedestrians.

The inference to be drawn from this is that the visitor and stranger within the gates exercise adequate care for their own protection and are not grown careless like the permanent resident.

IV.—Table classifying the Fatal Accidents according to their cause and circumstances, 1911-1912.

Age.	1911.			Total.	1912.			Total.
	16 and under.	17-60.	61 and over.*		16 and under.	17-60.	61 and over.	
To Pedestrians:—								
Stepped or fell or slipped off the pavement or a refuge (4) immediately in front of a motor-bus ...	6	11	5	22	11	15	2	28
Crossing the road midway and passing behind a stationary or slow moving vehicle into the front of a motor-bus coming in an opposite direction ...	15	3	2	20	16	5	4	25
Commencing to cross the road in front of a stationary or slow moving vehicle, and being caught by an overtaking motor-bus	5	7	—	12	3	4	2	9
Running heedlessly out into the roadway or being in the roadway hesitating and lacking in judgment ...	1	7	2	10	3	9	4	16
Knocked down by passing motor-bus on alighting from a tramcar in motion (3) or from a stationary tramcar (2)	—	—	—	—	—	4	1	5
Motor-buses mounting pavement through latent defect in steering gear (1), through collisions caused by other vehicles (4)	1	2	1	4	1	—	—	1
Motor-buses reversing on stand ...	—	1	—	1	1	—	2	3
Miscellaneous causes	—	1	3	4	2	9	2	13
Total	28	32	13	73	37	46	17	100
To Cyclists:—								
Turning out of side street into main thoroughfare at excessive speed or with cycle not under proper control and running into side of motor-bus	1	4	—	5	2	6	—	8
Cycle skidding and throwing off rider in front of motor-bus	1	2	—	3	4	4	—	8
Cycle not under control by reason of defect in cycle or loss of nerve ...	3	—	—	3	3	2	1	6
Collisions between cycles throwing rider in front of motor-bus ...	—	2	—	2	2	2	—	4
Cyclist attempting to pass between vehicles when the clearance was insufficient	—	—	—	—	—	3	—	3
Miscellaneous	—	—	—	—	—	3	—	3
Total	5	8	—	13	11	20	1	32

*Including a few cases where the age was unascertained.

TABLE IV. —*continued.*

Age.	1911. 16 and under.	1911. 17-60.	1911. 61 and over.	1911. Total.	1912. 16 and under.	1912. 17-60.	1912. 61 and over.	1912. Total.
MISCELLANEOUS STREET ACCIDENTS :—								
Children riding on the tail of vans for a lark and falling off or running out unexpectedly	5	—	—	5	7	—	—	7
Children playing in the streets at games which involved running out into the roadway	4	—	—	4	4	—	—	4
Suicides	—	1	1	2	—	—	—	—
Collisions due to skidding (3) or to passing other vehicles without sufficient clearance (3)	1	3	1	5	1	1	—	2
Unclassified	2	3	—	5	1	4	—	5
Total	12	7	2	21	13	5	—	18
PLATFORM ACCIDENTS :—								
Boarding motor-bus in motion and falling	—	1	1	2	—	1	—	1
Alighting from motor-bus in motion and falling	—	1	2	3	1	2	1	4
Alighting from stationary motor-bus and falling	—	—	1	1	—	—	—	—
Falling off staircase of motor-bus ...	2	2	—	4	—	2	1	3
Total	2	4	4	10	1	5	2	8
Grand Total	47	51	19	117	62	76	20	158

The following comments arise on the preceding table :—

Observations on the causes of accident.

1. That the carelessness of pedestrians is the chief cause of accident, arising out of heedlessness in stepping into the roadway or the crossing of the roadway, when the view is obstructed by other traffic.

2. That apart from this the causes of accident are so diverse that it is difficult to derive any conclusion from them as to what will increase the public safety.

3. That only one accident in both years was due to the existence of any defect in the motor-bus mechanism. This was a latent defect and could not have been previously ascertained by examination.

4. That in three of the five cases of passengers alighting from tramcars and being knocked down by passing motor-buses the passengers were alighting from the tramcar in motion, or not at an authorised stopping place.

5. That there was a very considerable increase in the number of fatalities to cyclists in 1912 over 1911, which is unexplained but may be connected with the weather, 1911 being above the average of fine years and 1912 of wet years.

6. That the primary cause of accident in the case of cyclists is not the motor-bus.

7. That the skidding of motor-buses accounts for very few indeed of the fatal accidents, namely 3 in the two years.

8. That in five cases in which the steering gear of the motor-bus was concerned only one was directly attributable to the motor-bus itself, the other four were consequent upon collision caused by another vehicle.

9. That the four fatal accidents occurring in connection with refuges are explained by the fact that in three, children of 5, 6 and 8 years respectively were killed and in the fourth case the deceased person was intoxicated. They do not point to gross carelessness on the part of the motor-bus drivers.

10. The causes, as set out in this table, do not profess to be complete. They are generalizations of the varied circumstances of each case and represent the main and primary cause of the accident only. It is not suggested that other elements did not enter into the final result.

V.—Table showing the Part of the Motor-bus causing the Injury 1911-1912.

Run over by—	1911.	1912.
Front Wheels	39	62
Rear Wheels	48	56
Total	87	118
Not run over	13	10
Doubtful cases	7	22
Platform cases	10	8
Grand total ...	117	158

Note.—Where both front and hind wheels have gone over a person, the case is attributed only to the front wheels.

Distribution of fatal accidents around the motor-bus.

It is to be observed that the fatal injuries are in the large majority of cases caused by being run over. The injuries have fatal consequences because of the weight of the bus. This is the factor which distinguishes the motor-bus from other wheeled traffic frequenting the streets, and unduly enlarges the record of fatal accidents. Less weighty vehicles may have equal or even greater incidence of accident, but without the notoriety attaching to fatal consequences.

Approximately as many cases of fatality occur in connection with the rear wheels as with the front wheels. An explanation of this feature is that the driver may be able to steer clear of a person in his track with the front wheels, but that the whole bus does not change its course rapidly enough to enable the hind wheels to clear.

The fatal accidents dealt with in these tables are those caused by vehicles of all kinds belonging to the London General Omnibus Company and its associated Companies. The statement below shows the exact class of vehicle causing the fatality:—

	1911.	1912.
Omnibus	113	156
Lorry	2	—
Chassis	2	—
Learners' Bus	—	2
Total	117	158

In one case the omnibus was being backed out of a garage by a fitter who did not hold a driver's licence for a Metropolitan Stage Carriage, but only an L.C.C. motor driver's licence.

VI.—Table showing the Time of Day at which Fatal Accidents occurred, and Distinguishing Weekdays from Sundays, 1911-1912.

1911.

Time.	Weekdays.			Sundays.			Totals.
	16 and under.	17—60	Over 60.	16 and under.	17—60	Over 60.	
A.M.							
6—7	...	..	...	...	...	...	...
7—8	1	1	...	...	...	...	2
8—9	1	...	...	...	...	...	1
9—10	1	2	...	...	1	1	5
10—11	1	1	1	...	...	...	3
11—12	5	2	1	...	...	...	8
P.M.							
12—1	6	5	3	...	...	...	14
1—2	1	2	...	...	..	...	3
2—3	5	2	2	...	...	...	9
3—4	3	...	1	...	..	...	4
4—5	10	5	1	1	...	...	17
5—6	2	3	...	...	2	...	7
6—7	2	4	...	...	1	...	7
7—8	4	4	1	1	...	...	10
8—9	1	4	...	1	...	...	6
9—10	1	3	...	...	1	1	6
10—11	...	3	2	...	1	...	6
11—12	...	7	...	...	...	...	7
MID.							
12—1	...	2	...	...	...	...	2
Total ...	44	50	12	3	6	2	117

1912.

Time.	Weekdays.			Sundays.			Totals.
	16 and under.	17—60.	Over 60.	16 and under.	17—60.	Over 60.	
A.M.							
6—7	...	...	1	...	...	...	1
7—8	...	1	1	...	...	...	2
8—9	3	...	...	...	...	...	3
9—10	1	2	...	...	...	...	3
10—11	2	4	...	...	...	...	6
11—12	2	1	...	...	...	...	3
P.M.							
12—1	4	2	1	1	1	...	9
1—2	5	2	...	1	1	...	9
2—3	6	4	...	...	1	1	12
3—4	3	3	...	...	1	...	7
4—5	6	2	1	...	1	...	10
5—6	6	2	1	...	1	...	10
6—7	4	9	6	...	2	...	21
7—8	6	5	2	...	1	...	14
8—9	6	12	1	...	1	...	20
9—10	4	6	2	...	...	...	12
10—11	1	6	2	...	...	1	10
11—12	1	4	...	...	...	...	5
MID.							
12—1	...	1	...	...	...	...	1
Total ...	60	66	18	2	10	2	158

The unascertained age of several persons accounts for a trifling discrepancy in the figures for 1911.

Distribution of fatal accidents according to time of day.

Upon this Table the first point to be noted is the number of fatalities occurring in the morning prior to 11.0 a.m. when the rush traffic is on. These are only few. In contrast, the evening hours between 4.0 p.m. and 8.0 p.m. when the rush traffic is on again and the streets are crowded are the heaviest of the day. Within this period in each year 35 per cent. of the whole fatalities happened. Between the hours of 11.0 a.m. and 2.0 p.m., which cover the mid-day interval, when the streets are busy, there is again a rise in the number of accidents, and of these it is noticeable how many consist of children.

A final feature of the table is the increase in the number of fatalities after 8.0 p.m. from one year to the next, 27, including 2 children, in 1911, rose to 48, including 12 children, in 1912. This increase in the number of children killed at such times of the day is matter of serious comment.

As the day declines, the continuance of accidents may be due to the greater difficulty of accurately judging the movements of vehicles in the streets in the dusk or under artificial light with its quickly moving shadows, and may be due also to the increasing carelessness of the people using the streets either on account of tired and relaxed faculties or the after effects of eating and drinking. It is to be noticed that fatalities continue among the people whose ages range from 17 to 60 right away up to close of traffic at 1 a.m.

Sundays' accidents are proportionately less than weekdays' accidents by about half:—

1911.	53 Sundays give	...	11	fatal accidents	or one to every five days
	312 Weekdays give	...	106	,, ,,	or one to every three days
1912.	52 Sundays give	...	14	,, ,,	or one to every four days
	314 Weekdays give	...	144	,, ,,	or one to almost two days.

This is in spite of the fact that the mileage of motor-buses on fine Sundays exceeds that for week-days.

Saturdays' accidents are on the other hand, as one might expect, proportionately greater than the general average:—

1911.	52 Saturdays give	...	25	fatal accidents	or one to every two days
1912.	52 Saturdays give	...	40	,, ,,	or three to every four days.

VII.—Maps showing the Locality and Class of each Fatal Accident, 1911-1912.

Exhibits.

E 1911.	Fatal accidents to pedestrians.
F	Fatal accidents to cyclists.
G	Fatal accidents to passengers.
H 1912.	Fatal accidents to pedestrians.
I	Fatal accidents to cyclists.
J	Fatal accidents to passengers.

Each map shows the age of the person killed under a threefold classification—

Under 16 years.
17-60 years.
Over 60 years.

Each map also shows whether the accident occurred on a week-day or Sunday.

Streets in which no fatal accident occurred.

Equally important for consideration are the streets in which no fatal accidents have occurred during the period covered by the analysis, 1911-1912. There are several busy streets in this category, for example, Regent Street, Shaftesbury Avenue, Stockwell Road, Vauxhall Bridge Road, and Park Lane. It shows that given certain favourable conditions, there is a disposition for accidents not to occur.

The presence of tramways in the streets not a material factor in causing increase of accidents.

The fatal accidents for the years 1911-1912 have been analysed into two groups according to the presence or absence of tramways in the streets where they occur. For comparison the mileage of motor-bus routes where there are tramways and where there are not tramways is also given, so that the comparison may be extended to cover the incidence of these accidents per mile of roadway in each case :—

	1911.	1912.
Number of fatal accidents in streets where tramways were present	56	81
Mileage of these streets	73	100
Fatal accidents per mile of street	·77	·81
Number of fatal accidents in streets where tramways were not present	61	77
Mileage of these streets	58	95
Fatal accidents per mile of street	·95	·81

From these figures it is apparent that in so far as the motor-bus is concerned, the presence or absence of tramways is not a cause of increased risk of accident.

VIII.—Notes on Special Localities where Fatal Accidents are more Frequent.

Every road or street which, in either of the two years for which the fatal accidents are analysed, had three or more occurring within its length, has been dealt with in this section. The notes are intended to give a general idea as to the class of road and its configuration. They are the result of casual observation and measurement.

In 1911 there were four roads which had three fatal accidents or more within their length. They are all long roads and that might be the determining cause.

Harrow Road.

In the Harrow Road, three little boys were killed. This is a fairly wide road (36 ft. carriageway), with two tram tracks in the middle and room for a line of traffic on either side. It is not a straight road. It is a busy road. It is not equipped with refuges. There are several schools and public places of resort in its length, as well as busy shopping sections.

Caledonian Road.

In the Caledonian Road, two children and an old man were killed. This is not a sufficiently wide road for a double set of tramway rails (39 ft. carriageway). It is straight. Again two tram tracks occupy the centre of the road and there is scanty room for a single line of traffic on each side. There are no refuges. There are schools in the road and at the lower end shops. The tram and bus services are the principal traffic of the road.

Edgware Road.

In the Edgware Road, four persons were killed. This is one of the busiest roads in London. It is wide (40 ft. carriageway) and provided with refuges in one section only. At the point where the accidents occur, there are many shops and streams of cross traffic. The Chief Commissioner of Police has already discussed the state of this road in his evidence before this Committee.

Walworth Road.

In the Walworth Road, three children and two adult persons were killed. This road is 42 ft. wide in the carriageway, except for a small portion at one end. There are two lines of tramway in the centre and no refuges of any kind. It is a busy street and lined with shops on both sides.

In 1912, there were ten roads which had three or more fatal accidents and call for comment. Two of them are repetitions from 1911, namely the Edgware Road with five cases and the Harrow Road with three, again all little boys. The other roads may be set out as before.

Putney Bridge.

On Putney Bridge, one child and two adults were killed. This bridge has to carry a very considerable traffic. Wandsworth Bridge has been practically closed throughout the year, so that Putney Bridge is the only bridge between Battersea Bridge and Hammersmith Bridge. It is not a wide bridge. The carriageway is about 25 ft. wide with room for three lines of traffic, two of which are occupied by tram lines. The tramway tracks are laid next the kerb. The tramways over this bridge were authorized in 1902, but were not constructed and opened until 1909. At this latter date, the circumstances affecting traffic on the bridge had entirely changed chiefly on account of the introduction of motor-bus services and the development of fast motor traffic.

Fulham Palace Road.

In the Fulham Palace Road, three children were killed. This is a fairly wide road (35 ft. carriageway) of residential character. It includes several schools and institutions but is not supplied with refuges. There are two tram tracks in the centre and room for a line of traffic on either side.

East India Dock Road.

In the East India Dock Road, three persons were killed. This has been recently widened and is now quite a wide road (56 ft. carriage way) with wide pavements. It has only two refuges although the width would readily accommodate more. There are tram tracks in the centre of the road. It is a busy road with much heavy and slow-moving traffic. It is lined with shops.

Tottenham Court Road.

In Tottenham Court Road, two children and one adult were killed. It is a wide road (43 ft. carriageway) and with refuges, 13 in number, in one section of its length. It is a busy road. There are no trams.

Fulham Road.

In the Fulham Road, four persons were killed. It is a road of varying widths, the carriageway ranging between 22 ft. and 45 ft. It is not a straight road. There are a few scattered refuges. There

are no trams. It is a busy road with several schools and institutions in it and shopping in character.

Praed Street.

In Praed Street, four persons were killed. This is only a short street, but the traffic has outgrown the accommodation. The extension of the "Bakerloo" line to Paddington, almost complete, may effect some relief. The carriageway is 36 ft. wide. There are no refuges or trams.

Barking Road.

Lastly, in the Barking Road, which is of very considerable length, six persons were killed, three children, two adults and one old man. It is a road of varying width, the carriageway ranging from 36 ft. to 56 ft. There are tram tracks in the centre throughout the whole length and altogether only two refuges. It is an important main road with a heavy traffic of mixed character.

Conclusions.

The general conclusion to be drawn from these brief particulars is, that the absence of refuges is the striking common feature of the several roads enumerated. It seems reasonable to infer that the provision of refuges at all recognised crossings where the roadway is of sufficient width to accommodate them, would tend to ensure the greater safety of the public.

Refuges in Streets.

Refuges in the streets are of use in regulating the traffic. They confine the traffic proceeding in one direction to its own side of the road, and in this way prevent encroachment upon the side of the road occupied by traffic proceeding in the other direction. They define the limits of the two streams of traffic and to some distance on either hand have the effect of keeping a clear space between them which is of assistance to persons attempting to cross. They further have the effect of restricting speed by impeding one vehicle overtaking another and occupying the whole available part of the roadway for the purpose.

The practicability of inserting refuges in a street must be a particular consideration and have regard to the volume and condition of the traffic using the street as well as to its configuration.

IX.—Table showing Verdicts at all Inquests with complete collection of Riders—1911-1912.

	1911.	1912.
Accidental Death	37	31
„ Driver exonerated	72	117
„ Conductor exonerated	—	2
„ Driver and conductor exonerated ...	3	2
„ Driver did all in his power to avoid accident	—	3
„ Negligence of driver	—	1
„ Slight negligence of Conductor ...	—	1
„ Driver cautioned	1	—
Suicide	2	—
Miscellaneous	2	1
Total	117	158

Verdicts of Juries classified.

Definite riders were added in 12 per cent. of the cases. These are set out below with the further observations of the coroner or jury.

Inconclusive character of the riders.

The riders are very diverse. Three or four make express recommendations as to the state of particular pieces of roadway. Others relate to improvements such as lifeguards and brilliant headlights. Others again relate to the rules of the road. Some few refer to the speed and some few again express censure on the staff. There is no one conclusion which can be drawn from them. They are merely indications of the direction in which the mind of the jury or coroner went.

Following on these riders only one driver has during 1911 and 1912 been committed for trial on a charge of manslaughter. This was in 1911. The accident occurred in the Lea Bridge Road; a carman was riding in a trap about 7 o'clock in the evening in December when a motor-lorry, driven by a fitter, overtook the trap. The lorry was said to be going 16 to 20 miles per hour. The trap swerved outwards and the two vehicles came in collision. The carman was thrown out and run over. This prosecution failed. The Grand Jury at the Central Criminal Court threw out the Bill and the driver was consequently

discharged without trial. In addition, two or three drivers have been charged with manslaughter prior to the inquest, but after the inquest the police have either withdrawn the charge or the magistrate has declined to commit for trial.

1911.

RIDERS AND OTHER OBSERVATIONS OF THE CORONER OR JURY. Riders in 19

Definite riders are preceded by the letter "R."

R Jury were of opinion that company should exercise more care in supervising buses before sending them on the road.

This was the sole case in the two years when the accident was caused by defect in the motor-bus.

R Caused by slight error of judgment on conductor's part.

Conductor started the bus with the man on the staircase.

R That Police should take steps to see that the rules of the road are observed under all conditions.

R There should be some recognisable system of signalling.

R There might have been some fault in machinery of bus as it should have been pulled up in less than 12 yards. They further considered that 10 miles per hour was too fast a rate to travel in the Strand.

R Jury thought that driver took corner at too excessive speed.

R That driver should have sounded hooter when passing rear of tram and slowed up to 4 miles per hour. No vehicle to pass at greater speed.

Motor-bus overtaking tramcar on near side.

R That driver of private motor-car should have sounded his hooter when approaching bus.

Collision between private motor-car overtaking motor-bus on off-side.

R Wish to censure driver of motor-car for not exercising care in passing motor-bus.

Collision between private motor-car overtaking motor-bus on off-side.

RIDERS AND OTHER OBSERVATIONS OF THE CORONER OR JURY.—*contd.*

Definite riders are preceded by the letter "R."

R Conductor censured for not keeping a good look-out.

Motor-bus reversing knocked child down.

R Accident was due to apathy of deceased.

R To the Great Eastern Railway Company pointing out lowness of arch.

Conductor standing on top of motor-bus struck by railway arch in passing under. This was not a regular route.

R That hooters should be sounded when passing stationary vehicles.

Jury advise that when motor-buses are backing, someone should be behind to warn people.

Coroner thought proper look-out should be kept while bus is backing.

Jury thought evidence was very conflicting.

Man stepped off kerb to cross road and hesitated, and was knocked down by front of bus. Wheels did not go over him.

1912.

—

R. Jury thought that the bridge should be better lighted. Riders in 1912.

Man found dead against girders of a railway bridge.

R. Motor-bus traffic is allowed to drive too fast through busy streets.

Manor Park between Stratford and Ilford.

R. That regulations should be issued by the police that "look-out" should be kept at garage.

Motor-bus backing out of a garage.

R. Jury did not think that driver pulled up as quickly as he might have done.

R. There was no evidence of negligence on the part of the bus company.

RIDERS AND OTHER OBSERVATIONS OF THE CORONER OR JURY.

Definite riders are preceded by the letter "R."

R. That it is very dangerous for motor-buses to pass through King Street Hammersmith on Saturday and Sunday nights.

This is congested with foot passengers at these times.

R. Want of precaution and negligence on part of driver but did not think negligence was criminal.

Cyclist crossed over front of bus out of side street. Apparently motor-bus did not give way.

R. That all buses should have lifeguards fixed to prevent persons being run over.

R. That all drivers should exercise more care when passing trams.

Pedestrian crossing road behind a tram struck by motor-bus coming in opposite direction.

R. Owing to congested state of traffic in Kingsland Road the attention of the Shoreditch Borough Council and the L.C.C. should be called to the width of the road also the attention of the police should be directed to that spot with a view to proper regulation of traffic.

R. In jury's opinion driver, seeing the man in the roadway picking up cap, should have pulled up to allow of his getting to a place of safety and that drivers should not take any risks when danger to life might be concerned.

R. We find that he fell from bus as the bus was jerked suddenly forward. We are not satisfied with the way conductor has given his evidence.

Passenger fell off staircase.

R. Driver should have pulled more quickly to the right

Motor-bus overtaking cyclist did not give way

R. That brighter head-lights should be provided on buses, and that traffic should be stopped during foggy weather.

R. That school teachers should point out to children the danger of riding behind vehicles.

RIDERS AND OTHER OBSERVATIONS OF THE CORONER OR JURY—*contd.*

Definite riders are preceded by the letter "R."

R. That motor drivers in general should be more careful.

Death from cerebral hæmorrhage due to rupture of blood vessel in brain. Impossible to say whether this was brought about or accelerated by accident of October 16th, 1912 or not.

Death took place on October 26th.

R. Jury desire to warn all such motor drivers to go carefully through crowded streets.

Child run over in Bethnal Green Road.

R. That L.G.O. Company should caution all drivers to use more care in driving where roads are undergoing repairs.

Woman crossing over road unable to get clear owing to falling at some repair works.

The foreman of the jury said the jury thought the Company should give notice to the drivers to stop when they see persons crossing the street under similar circumstances.

Man from off-side, hands in pockets, head down, in entire disregard of the traffic, walked into middle of motor-bus.

Coroner expressed his opinion that it was wrong for buses to take up passengers at tram-stops deliberately.

Jury think it advisable that the trams should stop at their right stopping places. Also that bus drivers should be a little more careful when passing trams.

Jury suggested road should be widened.

This is Church Street, Stoke Newington.

R. The jury exonerated the driver from all blame, and said he did his best to avoid the accident.

X.—Table shewing the Representation at Inquests in Relation to the Verdicts 1911-1912.

	Cases where deceased's relatives and Company represented by Solicitors or Counsel.		Cases where deceased's relatives only represented by Solicitors or Counsel.		Cases where Company only represented by Solicitors or Counsel.		Cases where deceased's relatives represented by Consulate Official.	
	1911.	1912.	1911.	1912.	1911.	1912.	1911.	1912.
Accidental Death	3	3	4	7	4	1	—	—
,, Driver exonerated ...	7	10	14	10	8	6	1	1
,, Conductor exonerated ...	—	—	—	—	—	—	—	—
,, Driver and Conductor exonerated	1	—	—	—	—	—	—	—
,, Negligence of Driver ...	—	1	—	—	—	—	—	—
,, Slight neligence of Conductor	—	1	—	—	—	—	—	—
, Driver cautioned	—	—	—	—	1	—	—	—
, Driver did all in his power to avoid accident ...	—	—	—	—	—	—	—	—
Suicide...	—	—	2	—	—	—	—	—
Miscellaneous	1	—	1	1	—	—	—	—
Totals	12	15	21	18	13	7	1	1

In two further cases the L.C.C. was represented at the inquest.

Solicitors at inquests of no effect upon verdict.

At 82 out of 117 inquests in 1911, the Company was represented by a Claims Inspector only.

At 136 out of 158 inquests in 1912, the Company was represented by a Claims Inspector only.

From these figures it is apparent (1) that the relatives of the deceased were more often represented at inquests by solicitor or counsel than the London General Omnibus Co.; (2) that the presence of solicitors or counsel at an inquest has no bearing upon the quality of the verdict given.

It is the common practice of the Company to send a representative of the Accident Department, and not the Company's solicitors.

Table XI.—Notes on the Length of Service of the Drivers concerned in Fatal Accidents and on the number of Hours Worked in the Day prior to their Occurrence.

Length of Service of Drivers concerned in fatal accidents.

Of the 256 drivers concerned in fatal accidents in the years 1911-1912, 137 or 54 per cent. had less than a year's driving experience with the London General Omnibus Company on a motor-bus at the time of the occurrence. In addition there was a number amounting to 14 or 5 per cent. whose length of service as drivers could not be ascertained, leaving only 41 per cent. or 105 who certainly had had over one year's driving experience.

Relative incidence of fatal accidents to Drivers of less or more than a year's experience.

These figures are not so striking as they would be if it were possible to bring into relation with them the total number of drivers employed who had had less or more than a year's experience. This can only be tested at given dates. For instance, at 31st December, 1912, an unfavourable date, being at the termination of the period under review, it is found that 42 per cent. of the men had 54 per cent. of the fatal accidents; or going back to the earliest date at which the classification of the drivers according to the length of their service was complete, it is found that 29·5 per cent. of the men had 54 per cent. of the fatal accidents. This is approximately the correct result. The improvement that time brings to these statistics is the improvement that experience has brought and is still bringing to the men employed.

In the preparation of these figures it was noticed that there was a small number of fatal accidents which persisted at all stages of experience. This shows that, included among them, there are accidents which are so purely accidents that no experience would enable them to be avoided.

No driver in these years had more than one fatal accident. The unrecorded case which completes the 257 analysed is that of a fitter. In addition there are 18 platform accidents in which drivers were not concerned.

Tables are given to illustrate two further points. First, the length of time each driver had actually been at work at the moment of the fatal accident; and, secondly, the amount of rest each driver had had before taking up duty on the fatal day.

Number of hours at work prior to fatal accident.	1911. No. of Men.	1911. Per cent. of total.	1912. No. of Men.	1912. Per cent. of total.
Under 1 hour ...	11	11	9	6
1—2 hours	11	11	8	5
2—3 hours	7	7	8	5
3—4 hours	14	13	11	8
4—5 hours	11	11	9	6
5—6 hours	7	7	16	11
6—7 hours	7	7	22	15
7—8 hours	8	8	19	13
8—9 hours	9	8	19	13
Total	85	83	121	82
9—10 hours ...	3	3	8	5
10—11 hours ...	7	7	11	8
11—12 hours ...	3	3	4	3
12—13 hours ...	1	1	2	1
13—14 hours ...	2	2	—	—
14—15 hours ...	1	1	1	1
Total	26	25	45	31
Grand total ...	102	100	147	100

This table shows that there is not any justification for the imputation that it is the long hours worked by the men which cause accident. In 1911, 83 per cent., and in 1912, 82 per cent. occurred within a nine hour limit. For 1911, 4 per cent., and in 1912, 2 per cent. occurred beyond a twelve hour limit.

Number of hours rest before resuming duty on days on which fatal accidents occurred.	1911. No. of Men.	1911. Per cent. of total.	1912. No. of Men.	1912. Per cent. of total.
Under 7 hours ...	2	2	1	—
7—8 hours	5	5	7	5
8—9 hours	9	9	13	9
9—10 hours ...	2	2	18	12
10—11 hours ...	5	5	6	4
11—12 hours ...	4	4	5	4
Over 12 hours ...	42	41	73	50
Not working	33	32	24	16
Total	102	100	147	100

This table shows that the incidence of fatal accident is greater with men who were off work on the previous day or had had a long spell of rest, rather than with those who had worked more continuously.

The totals of these tables fall short of the numbers of fatal accidents given in previous tables on account of the particulars as to conductors, learners, fitters and other persons concerned in fatal not being included.

XII.—Notes on the Causes of Fatal Accidents.

Speed as a factor in causing fatal accidents.

The judgment of speed is a difficult problem, and in the evidence given at the inquests, there is in consequence some variation in the estimates given by the witnesses, but it is clear that in the greatest number of cases the speed of the motor-bus was either moderate (that is ranging around 8 miles per hour) or slow (that is ranging around 4 miles per hour).

In certain cases, speed is referred to at the inquest proceedings as having a distinct bearing upon the cause of accident. The speed in these cases is not necessarily in excess of the statutory limit of 12 miles per hour; but speed which was an element of danger, having regard to the circumstances and conditions of the moment, or put in another way, which was an error of judgment on the part of the driver in the opinion of particular witnesses. Such cases only numbered 9 in 1911, or 7·7 per cent., and 8 in 1912, or 5·1 per cent.

The varying speeds of different classes of traffic.

Looking at the analysis in Table IV., it is apparent that the differing speeds of the various classes of vehicular traffic is an important element of danger. For example, it clearly enters in the two groups of cases:—

> Crossing the road midway and passing behind a stationary or slow-moving vehicle into the front of a motor-bus coming in an opposite direction.
>
> 1911. 20 cases. 1912. 25 cases.
>
> Commencing to cross the road in front of a stationary or slow-moving vehicle, and being caught by an overtaking motor-bus.
>
> 1911. 12 cases. 1912. 9 cases.

In the whole these figures amount to 66, or 25 per cent. of the total number of fatal accidents in the two years.

This element of danger becomes more accentuated where the slow-moving vehicle is of large size, and causes a wide angle of obscuration of the roadway. Photographs are given to illustrate by way of comparison the sizes of the three common types of passenger-carrying vehicles of the streets. (Exhibits K and L).

Unorganised character of vehicular traffic.

The unorganised character of the vehicular traffic in most of the streets only aggravates the danger arising from this cause. The suggested bye-law, under which slow-moving traffic would be compelled to keep near the kerb, might have a beneficial effect. It, however, raises this dilemma, that in 21 cases the presence of the

slow-moving traffic by the kerb was a partial cause of the accident. Against this have to be set the 50 cases where the deceased persons stepped or slipped or fell off the pavement and so met their death through the agency of the motor-bus. The motor bus would be less likely to travel near the kerb after the bye-law were enforced. The balance of advantage is in favour of the bye-law.

One definite advantage of such a bye-law would be that persons in the streets would know better what to expect in attempting to cross the road.

Such a bye-law would be in accord with motor-bus operation, for when the bus is stopping for traffic it is required to draw in to the kerb, and it naturally takes its place with the slow-moving traffic, pulling out again into the faster-moving traffic when it is in a position to keep to the required pace.

With unorganised traffic the slower vehicles prevent the faster ones from clearing off freely, and in places where there are possible openings there is an invitation to the faster vehicles to attempt dangerous passages in and out among the slower ones.

Increase in the range of speeds with motor traction.

The variation in the speed of vehicular traffic has spread over a wider range with the introduction of motor traction. Under horse conditions, the range would be from about 3 to 9 miles per hour, or from 1 to 3. Under motor conditions the slow-moving vehicle remains as it was, but the speed of the fast-moving vehicle has gone up to a legal limit of 20 miles per hour, and the range is now from 1 to 7 This variation in speed is fixed under statutory authority.

Congestion as a factor in causing fatal accidents.

Congestion, meaning by this the presence of a large volume of vehicular traffic in a limited space, is not a cause of accident. Congestion might appear to some to be a cause of accident, but at the busy times it is to be recollected that there are far more people in the streets and more vehicles passing so that the chances of accident are much greater.

Congestion is either a permanent feature of certain streets at certain hours of the day, and in this case is caused by the ingress and egress of persons going to work at the various centres of business, or it is of a temporary character caused by dislocations or by irregular movements of traffic in normally busy streets.

The regular congestion is to a large extent under police regulation, and when the regulation is effective, accidents are absent.

This is noticeable at places like the Bank crossings, Piccadilly Circus, or Hyde Park Corner. But the congestion caused by such crossings may have its serious consequences at some little distance back from the point at which the police are stationed, for example in Cheapside or in Piccadilly.

Temporary congestion is caused by the irregular flow of vehicular traffic, and is of an intermittent type.

The irregular flow of vehicular traffic.

This intermittent type of congestion is due to a variety of causes such as a street crossing, or the narrowing of a thoroughfare, or a momentary increase in the volume of traffic. From any one of these causes, one may see a knot of traffic collect together in the street, hold together for a brief while, and then string out again as the faster-moving vehicles clear. Pedestrians crossing the road can allow for a steady stream of traffic and can avoid dangers. They can allow for traffic that is moving in close order at an even speed. They do not seem able to allow for transitional moments when the character is changing from the one form to the other.

Turning to the inquest reports it is found that in 14 cases in 1911, and in 12 cases in 1912, the presence of dense traffic is referred to at the inquest as contributing to cause the accident.

In the opinion of the witness, there are four principal causes of the fatal accidents which occur in connection with motor buses ;

1. The main cause of fatal accident is the heedlessness of the injured person or of those responsible for the injured person in the case of children and the infirm. Only education and training in the hazards of the streets and the way in which they are to be avoided, or in the duty, which they have, to exercise care for others, will cure this.

Carelessness of the people.

The witness entirely agrees with the evidence which has been given by the drivers who have appeared before this Committee upon this point.

In so far as the remedy for this is within its power the London General Omnibus Company has endeavoured to cure these evils. By means of advertisements in the newspapers and of posters upon the buses, attention has

been called to the more common forms of accident arising from this cause. Leaflets summarising the advice which would be of benefit to passengers and others have been put into circulation with the map and guide to the routes worked issued each month. Of these, several thousand copies were sent to the public elementary schools. The publicity thus given to this question has stimulated activity in other channels of education.

2. It must be admitted that the statistics show that the limited experience of the driver is also a cause. This experience does not relate so much to the driving of the motor-bus as to the judgment which should be exercised in moments of danger, mostly arising out of the first cause. The older the driver, the more instinctive is his judgment of the foolishnesses of the people. He anticipates and protects them from themselves. **Limited experience of the drivers.**

Time is the only remedy for this, and already it has brought amelioration.

3. The third cause is the varying speed of the vehicular traffic in the streets already discussed.

4. The final cause is the intermittent opening and closing of vehicular traffic.

The better regulation of the streets in the way of sorting out the lines of traffic into uniform speeds might be of advantage, and certainly the provision of refuges and of recognised crossings would tend to diminish the risks.

PART III.

Questions affecting the Staff engaged in working Motor-Buses.

DRIVERS.

I.—Qualifications for Employment.

Police requirements of candidates for employment as drivers.

The qualifications required of a driver are fixed in the first instance by the various provisions which apply to candidates for a driver's licence. For the execution of these provisions the Metropolitan Police are responsible. The requirements are :—

1. A minimum age of twenty-one years.
2. A certificate of good conduct covering the preceding three years.

   Upon this certificate, enquiries are made as to the man's respectability and previous record.
3. A medical certificate of personal fitness.

Additional requirements of motor-bus companies.

The London General Omnibus Company are able to add to the stringency of these requirements by reason of the number of applicants for employment exceeding the number of openings to be filled. In this way, they—

1. Raise the minimum age.
2. Extend the previous character covered by enquiry to five years.
3. Select married men in preference to single men.
4. Select men with previous experience of driving in the streets of London.

The extent to which these added requirements are met, is shown by the following statistics for the men engaged in this capacity since 13th August, 1912, up to 15th January, 1913 :—

Age.	No. of men employed.	Of the No. employed, No. married.	Of the No. employed, No. with previous experience of driving.		
			1 year.	2 years.	3 years.
21	30	—	4	1	17
22-25	277	69	17	17	175
26-30	289	147	15	22	164
31-35	165	154	13	4	133
36-40	103	71	1	3	62
Over 40	85	83	3	—	79
Total ...	949	524	53	47	630

Except under special circumstances no one over 40 years of age is considered. The exceptions have been made in favour of horse bus drivers and old employees.

Of the total number engaged, 55 per cent. were married at the time, and there is little doubt others corrected this disability very quickly. Again 66 per cent. had had three years previous traffic experience.

Comments on the class of man best adapted to driving a motor-bus.

It is not every class of driver that has the aptitude to become a good driver of a motor-bus. For example, tram drivers are not apt to accommodate themselves to the more flexible conditions, or taxi-cab drivers to the reduced speed limit. This further qualification is therefore to be made. Carmen or the drivers of heavy commercial vehicles are the most satisfactory type, and about 80 per cent. of the candidates employed are recruited from this class.

Other types of applicant thought suitable for the work are discharged soldiers, sailors and fire-brigade men, because they are used to discipline, mechanics and men of general occupation who have qualified as motor drivers, because their training is in part begun. Only 42 men were accepted on certificates of fitness granted by recognised motor schools. Sixty-two men came from the army, navy, fire brigade or police, and the balance had traffic experience as shown in the table

Applications for employment are usually made by letter, and likely candidates are interviewed. Those who are approved are required to fill up a special form (Exhibit M).

Form of application for employment. (First step.)

Most applicants for employment provide personal references. Some are already in possession of a County Council licence to drive a motor-car. In this case it is inspected, and if there are any endorsements for exceeding the speed limit, driving to the common danger, or other offences, the application is not entertained. If the candidate is not in possession of a County Council licence he is required to obtain one at once. This entitles him to drive although it is a matter of routine and has no significance in connection with the fitness or competence of the man for his occupation.

This is an important point : a learner is entitled to drive a heavy motor-car but not to ply for hire with a Metropolitan stage carriage though it is also a heavy motor-car.

Enquiries are made as to the character of the applicant. The form of letter used in this case is submitted (Exhibit N). A period of four days commonly elapses between the filling up of the form of application and acceptance for training by the Company.

If the particulars set out on the form attached are satisfactorily answered, the candidate is then sent to the Company's medical adviser for examination. This again adds a greater stringency to the requirements for a license. Not any qualified medical practitioner can give the certificate but only such an one as is selected by the Company.

Medical examination of candidates. (Second step.)

The certificate given is in the following form:

Name.....

Address.....

I HEREBY CERTIFY that I have this day examined the above, who is applying for a position as Motor-bus driver to the LONDON GENERAL OMNIBUS COMPANY, LIMITED, and beg to report as follows:—

Is this man physically and mentally fit to undertake the duties of motor-bus driving?

.....

.....

.....

Signed.....

No man is accepted who cannot secure a clear certificate and every factor tending to complete capacity such as eyesight, hearing, organic disease, etc., is covered in the arrangement with the doctor.

The points to be covered by the medical examination are set out in greater detail in the form of report required by the Police. See form attached (Exhibit O). This report is also signed by the Company's own doctor at the same time as the preceding one.

The object of these notes is to show that every reasonable care is taken to secure a high standard of character and fitness from the men who are to be employed on the streets as motor-bus drivers, and further that in the result the men so employed are picked men.

The rigour of the selective process.

Detail statistics are not kept to show the manner in which the applicants are reduced in number and in what respect they are unable to reach the requisite standard, but it is considered that only from 10 to 15 per cent. of those applying are ultimately accepted for training

When an application is accepted, the man is told to apply at Scotland Yard for a stage carriage licence. He then has to comply with the police requirements. He presents to the Police a medical

certificate in the form specified by them and a letter from the Company expressing a willingness to employ him. The Police do not favour applications from persons without prospective employment as otherwise a person might hold a driving licence and yet not be in practice as a driver. From the Police he receives a permit and requisition form. The permit is an authority to call at Scotland Yard for the purpose of being tested, and the requisition is a form to be filled in and returned. This calls for a certificate of employment from the last employer, and the signature of two householders acquainted with the applicant for the last three years (Exhibit P). The Police personally investigate and verify the statements in the requisition.

Application to the Police for a licence. (Third step.)

A requisition form is only valid for a period of four weeks, so that supposing a man fails to pass the police test within that time, it is necessary for him to apply again to Scotland Yard for a further requisition form, upon which the investigation is repeated. As the training period covers four to five weeks, it means that a man has only one chance of presenting himself for test without a review of his application. On this account it is the practice of the Company to suspend the application to Scotland Yard for a fortnight during which the period of training is commenced. It is then possible for a candidate to present himself twice on the one requisition form. If he fails at the second test, he enters no further requisition until such time as he passes the test, and the investigation of character is then re-opened.

When a candidate is approved he is told off to a garage for training. He is not definitely engaged, and he is not paid any wages during the training period. The training is an expense which is met by the Company without charge. It converts an unskilled into a skilled man. Having regard to the wastage of trained men, the expense is quite considerable.

As a concluding note, it may be remarked that the drivers consider that the requirement of two licences, one under the Motor Car Act and the other under the regulations affecting Metropolitan Stage Carriages, is a distinct grievance. The witness agrees with them that it seems an unnecessary duplication. Tramway drivers are only required to have the one licence for driving a stage carriage.

DRIVERS.

II.—Course of Training.

The instruction given to intending drivers is of two kinds :— Instruction is both technical and practical.

1. Technical instruction by specially qualified instructors at the demonstration chassis rooms.

2. Practical experience of the driving of a motor-bus under the guidance of special driver instructors.

Both kinds of instruction are given concurrently.

The approved candidate joins at a garage on the day following his engagement. He is attached to a driver instructor who at once shows him the various routine duties which are necessary to be performed before a motor-bus is taken into service. This is repeated every morning before the learner's bus leaves the garage.

Upon the first day the candidate is taken in the learner's bus to the school of instruction and there has explained to him in an elementary form of what the mechanism of a motor-bus consists. This explanation covers the morning. From the class room he returns to the garage and in the afternoon is taken into streets where there is no appreciable traffic in order that he may have practical acquaintance with the operations to be performed in driving. At first he does not drive. Upon the second day the process is repeated, the explanation going further into detail and the names of the component parts of the engine being impressed upon the memory. First period of technical instruction. (A)

Then come twelve days of continuous instruction upon a learner's bus. The driver instructor takes a batch of six men (more only when there are candidates taking a second course and in this case not more than ten) out in this bus, and one by one they sit beside him and see him drive and eventually take their turn at driving under his guidance. As the men become more competent to drive, the bus is taken into streets where there is more traffic and still more, progressively. First period of practical driving.

In such manner do they practise driving that they become used to the exigencies of the highway and the various manœuvres incident to the safe and smooth working of the bus.

At the close of this first period of twelve days the men are again taken to the class rooms, and on the next two days receive further instruction on the chassis. This time the instruction covers the same ground as on the prior occasion but is of a more technical character. Second period of technical instruction. (B)

Second period of practical driving.

Then commences a second period of twelve days' practical work. This includes the reversing of the bus, driving of the bus backwards, and the turning of corners. This takes place within the limits of the garage. At this time also the bus is taken into crowded streets, and the learners practise under the most arduous conditions prevailing.

Third period of technical instruction. (c)

At the close of the second period of twelve days, if the learner has shown aptitude to his task, and diligence, and is in the opinion of the driver instructor competent to drive, he is again sent to the class rooms for a further two days' technical instruction. This consists of an explanation of the various common types of defect which may develop in the machinery, and of the steps that should be taken in each case to prevent damage and ensure safety. The previous instruction is also repeated and revised to test the memory of the candidate.

Form of Certificate of Proficiency.

At this point in ordinary course the learner should be fit for the Police test. He must obtain a certificate in the following form to cover his period of training before he may present himself at Scotland Yard. This form is for inclusion in the Company's records.

LONDON GENERAL OMNIBUS COMPANY, LIMITED.

Engineer's Department.

CERTIFICATE FROM LECTURER.

Learner.....

.....Garage.

This man has received instruction from me and seems to have satisfactorily grasped the details of the various subjects.

Class "A" (Signed) .....Date.....

Class "B" (Signed) .....Date.....

Class "C" (Signed) .....Date.....

CERTIFICATE FROM DRIVING INSTRUCTOR.

This man has received driving instruction from me, and in my opinion is now quite competent to drive in Public Service.

Signed.....Instructor.

Date.....

Garage.....

Remarks as to general character.....

Not everyone receives this certificate although the failures are a very small percentage of the total number proceeding with

the training. The driver instructor is required to refuse during the training period anyone developing undesirable tendencies, such as excessive speed, recklessness or carelessness. Others withdraw from the training for reasons of their own. Altogether there is a wastage of from 12 to 15 per cent. of the numbers accepted for training.

Certain points upon which instruction is given.

Part of the practical instruction given by the special driver instructors is concerned with the avoidance of accident. They explain to the men how accidents most commonly happen and advise them on the best means of obviating them.

Part of the instruction given at the class rooms consists of a summary of the legal provisions affecting drivers, particularly as regards speed, the various offences of wanton and furious driving, or driving to the common danger, and the rules of the road.

The practice at the moment is to give each candidate a synopsis of the various rules and instructions under these heads, and is to be extended so that in the intervals of training he may familiarize himself with their contents. Copies are submitted. (Exhibits Q and R.)

Note on the Rules and Instructions.

No definite rule book has been issued covering all the points which a driver should know. The police supply to the drivers a copy of the Red Book in which a great many questions of interest to them are included.

The Company's engineer attends to such matters as the technical rules covering the upkeep and maintenance of the buses in proper condition and the traffic auditor attends to such matters as are connected with the commercial duties of the staff. In addition to this, circulars are issued from time to time from the General Manager's Office setting out the miscellaneous rules which are so requisite for safety.

It is thought better to issue continually fresh supplies of these circulars emphasizing particular points than to supply a man with a fixed rule book and leave it at that. A very considerable number of circulars were issued during the course of last year and these have been summarized and completed in the form attached.

In a business which is yet lacking in experience on account of the newness of the problems which it has to face, a rule book could not in the nature of things be satisfactory.

Candidates who pass the police tests and receive public carriage licences receive still further instruction in the rules which have been adopted by the Company for the conduct of their business, particularly with regard to the avoidance of accident. This takes the form of two further classes, and at their conclusion a man is allotted to a definite garage for employment as a motor-bus driver.

Further practical instruction at the garage.

This is not the end of instruction. The man reports himself at his garage, and comes under the control of the foreman driver attached to it. He is placed with a driver who has had considerable experience. He accompanies him and receives from him instructions in service conditions, learning the various routes upon which the motor-buses working in and out of that garage run, and the points or regular stopping places on those routes.

They alternately take up the driving, the new man benefiting under the direction of his more experienced fellow. This continues from four to seven days, and upon the report of this driver depends the time at which the new man is allowed to take a bus out on his own account.

Even after a man has been sent out in charge of a bus an experienced driver is told off to make journeys with him at intervals of a few days, and report to the garage superintendent as to his ability, so that in every way care is taken to ensure that drivers are as efficient for their task as it is possible for them to be. Eight men are exclusively engaged in this work at the present time.

Summary of training given.

To summarise these particulars, the course of time occupied in the preliminary training of a driver is over four weeks, and includes six days upon which technical instruction is given. Actual driving practice during this period would amount to 40 hours or 5 eight hour days. On the completion of this, there are two further days upon which instruction is given in the rules and regulations, and almost another week in traffic details and conditions. The course extends to approximately five weeks, and for those who are not quick at learning may extend to an even longer period, for suitable candidates are allowed further courses as thought desirable.

Two points upon this training deserve special notice :—

1. The training takes place in the streets.

   The use of the streets for training.

   It is clear that there is no other possible school which can give to the learner the right sense of his position or make him acquainted with the risks and dangers that are to be faced.

Remove the learners from the street and the liability to accident of the drivers is increased. You only shift the incidence.

Every care is taken to avoid risk and the user of the streets is carefully graduated both as to the traffic conditions in them and the degree of training of the learner.

2. The training is uniform in character.

Uniform standard of training.

To secure this the whole work of selecting and training men has been placed in the hands of one official. He is responsible both for the demonstrators at the class-rooms and the driver instructors.

From time to time this official makes it his business to join the learners' buses and see for himself that the course is being carried through systematically.

All the class demonstration is given at one point and to this point all the learners' buses come with their contingents. This brings together all the people engaged in the special work and by the exchange of ideas secures a common method and a common standard.

The use of the [illegible] for education purposes.

As a final note it may be mentioned that cinematograph demonstrations are made use of for the purpose of educating the staff. These demonstrations cover the common forms of accident and how to avoid them. A lecture explanatory of the films is given at the same time.

As a matter of interest two illustrations of the demonstration rooms at Grosvenor Road are included. (Exhibit S.)

DRIVERS.

III.—Method of Payment.

Drivers are paid at an agreed rate for every mile that they run with a motor-bus in ordinary passenger service.

Mileage rate of payment.

Every driver taking up a day's duty has a scheduled mileage to perform in accordance with the service requirements of the route upon which he works. A driver cannot exceed his scheduled mileage, and he may not complete it within less than the time allowed according to the timetable established for the given route.

The scheduled mileage to be performed determines the actual payment.

Mileage is the natural basis for accounting the work done in operating motor-buses. All expenses such as for tyres or petrol are measured out in this way, and it was an obvious method, therefore, to apply to determine wages. All records tend to be kept on a mileage basis.

Reasons for adopting a mileage rate of payment.

At the time when motor-buses commenced to work, there were other considerations which weighed with those who determined upon this system of payment. The principal among them was the unreliability of the motor-bus and the absence of a check upon the carelessness or wilfulness of a driver. With recent improvements both of machines and of men, this factor has become much less important, except for its disciplinary effect.

The motor-bus still remains a piece of mechanism which is open to abuse and which may be kept more constantly at work, if treated fairly and without undue strain when in service, and if little adjustments not serious in themselves are made speedily. It is also a piece of mechanism which needs to be closely watched and its condition reported from day to day. When the earning capacity depends on maintaining the efficiency of the motor-bus, there is some incentive to the driver to attend to all these matters. It needs less supervision to secure good results.

It is not possible to criticise this method of payment from the point of view of causing accident, as clearly it all turns upon the time which is allowed for the working of a given route, and whether it is ample or not, or whether it is checked sufficiently or not by time-keepers. These questions are dealt with in a later part. (See Part V., Section 2.)

Timing of a route the critical question.

Classes of drivers.

There are three classes of drivers, arranged according to length of service. The mileage rate of pay increases in amount for each class.

3rd class, under 6 months' service (one star); 1·15d. per mile.
2nd class, from 6-12 months' service (two star); 1·20d. per mile.
1st class, over 12 months' service (three star); 1·25d. per mile.

Bonus scheme prior to 1st Jan., 1913.

Certain drivers, chiefly of the 1st class received, prior to January 1st, 1913, in addition a bonus of 3d. per day, if the scheduled mileage for the day was completed without accident for which he could be held to blame. This bonus was granted to servants of the company of two years' standing; but a servant of two years' standing transferring into the grade of driver from another grade, received the bonus although not of the 1st class and without experience in driving extending to two years. From a week's figures taken out in October last, it was found that 90 per cent. of the drivers eligible (1,599) earned this bonus.

Present bonus scheme.

It was thought that this limited bonus system might have some effect in reducing the number of accidents by affording additional inducement to the men to avoid them. Accordingly on the 1st January, it was extended to all drivers on the following terms :—

A daily bonus of 2d. to all drivers completing their full scheduled mileage for the day without accident for which they can in any way be held to blame.

An additional quarterly bonus of 14s. to the best drivers up to 5 per cent. at each garage, and of 10s. up to the next 5 per cent. Of the latter bonuses, two are specially reserved for spare drivers. By best is meant the driver obtaining the greatest number of daily bonuses.

An adjustment has been made in the rate of pay to compensate the older bonus drivers for the reduction in rate from 3d. to 2d. (1·26d. per mile.)

This bonus scheme has now been in operation for a full period of three months, and has given results which exceed the basis upon which it was framed.

Many more drivers qualified for the quarterly bonus than could be covered by the 10 per cent.; so that it is again under consideration for readjustment.

A further note to complete the scheme of payments. Drivers taking up duty are paid at the rate of 6d. per hour for standing by in cases when the motor-bus is held up in the garage or on the road in consequence of breakdown for which he is not to blame. Payment under this head is in the discretion of the Garage Superintendent. **Standing-by payments.**

The following table shows the effect of these various methods of payment for the week ending 9th April, 1913, in relation to the time spent at work :— **A week's pay arranged.**

Regular Drivers.	Average No. of Days worked.	Average Weekly Payment. On mileage rates.	For standing by.	Bonus.	Total.
3rd Class ...	5·51	£1 16 0	2d.	9d.	£1 16 11
2nd Class ...	5·25	£2 4 8½	1d.	10½d.	£2 5 8
1st Class ...	5·52	£2 6 8½	2d.	11d.	£2 7 9½
Bonus Class	5·60	£2 8 6	4d.	1s.	£2 9 10
Spare Drivers.					
3rd Class ...	4·44	£1 13 6	5d.	8d.	£1 14 7
2nd Class ...	4·40	£1 15 7	8d.	9d.	£1 17 0
1st Class ...	4·14	£1 13 6½	8d.	8d.	£1 14 10½
Bonus Class	4·65	£1 18 4½	1s. 3½d.	8½d.	£2 0 4½

At the 31st March, 1913, a statement was prepared showing the length of service of all men employed as drivers. It is as follows :— **Number and length of service of Drivers employed.**

Drivers. Length of service.	Number.
Under 6 months (3rd Class)	891
6—12 months (2nd Class)	1,169
1—2 years (1st Class)	736
2—3 years	482
3—4 years	335
4—5 years	261
5—6 years	165
6—7 years	174
7—10 years	100
Over 10 years	33
Total ..	4,346

Those with over five years' service must necessarily have been employed under horse-bus conditions.

CONDUCTORS.

IV.—Qualifications for Employment.

Requirements for employment as a conductor.

In connection with the engagement of conductors the Police requirements under the London Hackney Carriage Act, 1843, fix the minimum age limit at 21 years, and the Company have fixed a maximum age limit at 35 years for new men.

Enquiries are made into applicants' previous record as in the case of drivers, and both the Police and the Company require to be satisfied as to the respectability and general good conduct of each man.

The form of application included (Exhibit T.), shows the character of the information required, and this is duly verified. The form used in making enquiries is also included (Exhibit U.).

Medical examination.

The medical examination of candidates for the express purpose of testing their physical fitness for the post is of recent introduction. There is not a physical standard set up, as it is considered that men under the usual standard of size are better adapted to the task which they are to undertake. The form of medical report in use for this purpose is included (Exhibit V.).

Basis of selection.

The really selective agency which operates to maintain a high standard among the conductors is the excess of applicants to the vacancies. This is a widely fluctuating factor varying with conditions in the labour market. Just now about 20 per cent. of the applicants are taken, and of these 5 per cent. are subsequently rejected.

The following table shows the number of conductors engaged during the year 1912 under groups according to their age, and also shows that 49 per cent. of the whole were married : **Conductors engaged in 1912.**

No. of Conductors employed, 1912.		
Age.	No. of men employed.	Of the No. employed, No. married.
21	181	16
22-25	708	205
26-30	623	303
31-35	372	287
36-40	217	194*
Over 40	71	62*
TOTAL	2,172	1,067

* Transferred from The Metropolitan Steam Omnibus Company Limited.

In making a selection, preference is given to men of good education, alertness, and general capability. The previous occupation of the candidate is considered, and particularly the length and continuity of his service in his previous occupation.

Research into the records of the past employment of the 2,172 men employed in 1912 yields curious figures. The largest number were those who were unable to continue or start employment as drivers, viz., 325. Labourers come next, 239 ; soldiers next, 229 ; warehousemen next, 210 ; carmen next, 143 ; shop assistants, 123 ; indoor servants, 112. **Previous employment of conductors, 1912.**

Below 100 there are several extensive groups, such as railway servants, clerks, milkmen and outside porters. Then follows a list of 68 trades or callings, each of which contributed some. Almost every trade that you could think of is included, and some that you would scarcely credit, such as a sweep, a musician, a kennelman, a tea sampler, a golf caddie, 2 photographers, 2 gymnastic inspectors, 3 fish friers. From this catalogue, it would be impossible to lay down any rules of selection based upon past experience.

CONDUCTORS.

V.—Course of Training.

Upon acceptance, a candidate for the post of conductor receives instruction upon two points :— **Training of conductors.**

1. The arrangements of the Company as they affect the conductor, having particular regard to the organisation for securing proper discipline and control.

2. The method of working adopted by the Company in the conduct of its business.

The candidate is next sent to a garage for practical instruction in the duties he has to perform, and he is trained under the direction of an older and more experienced conductor upon motor-buses in actual service. He is under the charge of the Yard Inspector, who is a traffic official permanently attached to a garage, and on completion of the training, this official gives a certificate in the following form :—

From

The London General Omnibus Company, Limited,

CHIEF OFFICE.

.....191

To the

INSPECTOR,

.....Yard.

Put the Bearer..... (Badge.....) to practise as Conductor on your routes.....days, after which instruct him to again attend this Office.

M. J. DAVEY,
Traffic Manager.

This man has been at practice with Conductor..... for.....days, and is now competent to take charge of a Car, being fully acquainted with the duties.

.....Conductor.

.....Inspector.

.....day of.....191

During my practice, I acknowledge to have been thoroughly instructed in the duties required of me as a Conductor.

.....New Conductor.

The period of training in normal cases extends to fourteen days. The period which usually elapses before the candidate obtains a licence from the Police is three weeks.

Throughout the course of his practical training which occupies half of the day, the candidate reports at headquarters and is continually examined as to his proficiency and receives further instructions.

He receives a synopsis of the rules and regulations adopted by the Company in the same way as the driver, and is expected to be fully acquainted with them.

Some particulars of instruction given.

The instruction turns largely upon the peculiar work of the conductor, the sale of tickets and the accounting for them and for the money received for them. The following points which form part of the instruction may be mentioned :—

1. The inspection of the motor-bus before leaving the garage each day to ascertain its condition and fitness for work as a passenger carrying vehicle.

2. The Police Regulations affecting the working of an omnibus.

3. The duties to be executed to secure the safety and convenience of passengers at stopping points.

4. The legal position of the conductor in relation to his passengers in connection with offences of various kinds, such as disorderly conduct, unfit condition to travel, etc.

5. The necessity to stop the bus for passengers.

CONDUCTORS.

VI.—Method of Payment.

The basis of payment adopted for drivers applies equally to conductors with the difference that the mileage rates are lower. **Mileage basis of payment.**

There are, too, three classes of conductors :—

3rd class, under 6 months' service (one star); ·80d per mile.
2nd class, from 6 months to 2 years' service (two star); ·90d per mile ;
1st class, over 2 years' service (three star); ·95d. per mile.

Conductors are further paid at the rate of 4d. per hour for standing by where the motor-bus is held up on the road or in the garage for causes outside the conductor's control. **Standing-by payment.**

The following table shows the effect of these methods of payment for the week ending April 9th, 1913, in relation to the time spent at work :— **A week's pay averaged.**

Regular Conductors.	Average No. of days worked.	Average Weekly Payment, On mileage rates.	For standing by.	Bonus.	Total.
3rd Class	5·39	£1 8 5	—	4d.	£1 8 9
2nd Class	5·57	1 14 7	½d.	5½d.	1 15 1
1st Class	5·52	1 15 11	½d.	5½d.	1 16 5
Spare Conductors.					
3rd Class	4·43	1 3 5	½d.	4d.	1 3 9½
2nd Class	4·97	1 8 6	—	5d.	1 8 11
1st Class	5·00	1 11 2	1d.	5d.	1 11 8

There is also a bonus scheme in operation for conductors. **Bonus scheme.**

It is of recent introduction and commenced on 1st January last. The basis of the scheme is that if in any week the regular conductor can return four days without any accident for which he can be held to blame, he receives 6d. The spare conductor is granted the bonus if he can return four days without accident out of seven consecutive days' work.

Number and length of service of conductors employed.

The number of conductors employed did not increase materially in number until the year 1912. At January 1st, in 1910, there were 2,096, and in 1911, 1,863, and in 1912, 2,366. The classification of conductors was completed in November, 1911, and of the 2,366 then on the books 1,455 were in the first class, 738 in the second class, and 173 in the third class. A more detailed examination of the length of service at 31st March, 1913, has been made with the following result :—

CONDUCTORS :

Length of Service.	No.
Under 6 months (3rd Class)	945
6—12 months (2nd Class)	1,307
1—2 years (2nd Class)	708
2—3 years (1st Class)	259
3—4 years	176
4—5 years	151
5—6 years	180
6—7 years	124
7—10 years	203
Over 10 years	342
Total	4,395

The running sheet made out by the conductor for his day's work is the basis used by the accountant for determining the amounts to be paid to the conductor and to the driver associated with him.

GENERAL.

VII.—Accident Club.

Reason for existence of club.

The London General Omnibus Company have made a practice of, in effect, fining their drivers and conductors to blame for accident, the fines having relation to the amount of the damage caused by the accident within a fixed limit. This practice may have been suggested by the provisions of section 28 of the London Hackney Carriage Act, 1843, but is not based on this Act but upon an agreement with the men. It was open to the Company to dismiss men involving it in the payment of damage. As the consequences of dismissal are of serious import to men engaged in an occupation involving the keeping up of a licence as a condition precedent to their being allowed to follow it, the Company have to some extent waived their right and instituted what is a practice of fines.

To protect themselves against the incidence of these fines the men employed in these capacities by the London General Omnibus Company have formed a club. The present club which is the successor to previous examples, having a history extending back over 40 years, was formed in 1908 at the time of the amalgamation.

Management of club.

The Club has a committee elected by the men themselves and representing each garage, and the committee again elect their secretaries (three in number) from among the men to act for the club in the conduct of its business. The Company takes no part in the management or control of the Club.

Membership of the club is in effect compulsory; that is, the Company do not employ persons in the capacity of driver or conductor who do not express their willingness to conform to the Club rules and sign the form of acceptance.

The rules of the Club are set out on one of the exhibits. (Exhibit W.)

Contributions to and payments by club.

The contributions payable to the Club are 2d. per day by every driver for each day that he works and 1d. per day by every conductor. These amounts are deducted by the Company from the pay roll for each week. There is further an entrance fee of One shilling.

It will be noted that by agreement with the Company, the liability is limited to £8. The procedure is for claims for damage to property not apparently exceeding £8 in amount to be transferred to the club direct and settled by them, but when the claim exceeds £8 or relates to personal injury it is settled by the Company, subject to the Company's right to recover £8 from the club if it so elects.

Further, one-fourth of the amount paid by the club in discharge of any claim is recoverable from the member responsible for the accident giving rise to the claim, at the discretion of the Club Secretaries.

Claims arising out of injury to the person are not left to the Club. In settling claims arising out of damage to property the Club acts as agent for the Company, but the correspondence is conducted sometimes in the name of the Club and sometimes in the Company's name. There is no rule as to this. It exercises a like discretion as the Company in settling claims, preferring to settle more often than to risk the uncertain issue of a contest.

Practice of club.

This is the principle upon which the Club is constituted; the practice differs somewhat. In point of fact the Company receives only a proportion of the sums due to it in respect of the claims for injury or damage, and the funds standing to the credit of the club at the close of each year are shared out to the members in accordance with the rules.

The club also takes part in any prosecution affecting its members, supplying legal assistance and paying the fines.

The Secretaries to the Club have supplied the following figures with respect to the dealings of the club in the year 1912: Accounts of Club for 1912.

ACCIDENT CLUB.—1912.

	£	s.	d.	£	s.	d.
Amount received for entrance fees...				97	0	0
Amount received from members in respect of daily payments ...				11,866	0	0
Amount due to the Club from members in respect of the one-fourth share recoverable ...	2,962	0	0			
Less amount remaining unpaid ...	1,445	0	0			
				1,517	0	0
Total Receipts ..				£13,480	0	0
Amount due to the Company in respect of claims	14,390	0	0			
Less amount remaining unpaid ...	4,909	0	0			
				9,481	0	0
Amount paid by the Club in respect of fines and as compensation for loss of wages attending Court...				42	0	0
Expenses of managing the Club including legal expenses ...				1,434	0	0
Total Expenses ...				£10,957	0	0
Balance				£2,523	0	0

Of this balance £2,490 was shared out, the full share of a member amounting to 8s.

Effect of existence of club on men.

An important point to note is the small amount spent by the club on fines. 194 cases were submitted to it by members, and of these 153 were refused under the rule (No. 5) which relieves the club from responsibility if the member be to blame himself. The £42 may therefore be looked upon as disbursements to innocent members to defray expenses attendant upon prosecutions. In no sense can the club be considered to have acted as a shield to its members from the consequences of an infringement of the law.

The existence of the club must have a salutary effect on the men in deterring them from accident, as the consequences of accident serve to deplete the funds available for the share out, although the Company by not insisting upon their strict right to contribution may be deemed to have weakened this effect. In point of fact the club is always insolvent.

The club is in no way disciplinary and does not serve to relieve the Company of any responsibility in connection with accidents. The discipline of the staff is carried out apart from any consideration of the effect of the club in fining its members, although this is a contradiction of the basis upon which the club is constituted.

It is questionable whether it is desirable to encourage an insurance against the consequences of accident as tending to relieve the men of the necessity for extreme care. The insurance of vehicles against damage arising out of accident is admittedly one factor in spreading carelessness among the drivers.

GENERAL.

VIII.—Prosecutions.

From time to time prosecutions of the drivers and conductors are undertaken by the Police or by other parties, such as tramway undertakings and public bodies.

The offences for which prosecutions are undertaken vary much.

The criminal law has innumerable special provisions which affect drivers and conductors as a class. They are scattered in many Acts of Parliament and Statutory Orders. It would be a matter of great convenience if they were collected together and standardised, particularly as the penalties attaching to them are not in any way systematic

Particulars on these subjects have been supplied to your Committee by other witnesses, in particular the number of prosecutions have been put in by the Police.

Prosecutions personal to the staff concerned.

The Company has not found it possible to keep a complete record of the prosecutions of its servants, and on this account has abandoned the attempt, as a partial record would have operated unjustly.

A prosecution is deemed to be a personal matter of the driver or conductor concerned. The summons is in most cases served upon him direct, and the Company receives no official notice of the fact. The penalty for the offence is exacted by a Court of Justice, and further penalty for the same offence does not seem to be justified. This is a further reason for letting the record of such matters pass.

It may be pointed out that the Magistrates have power to suspend or endorse the motor driving licence under which the men are able to carry on their employment. If they, therefore, do not take this step, it must be because they cannot consider the offence brought to their notice sufficiently serious. The Company may, therefore, be excused continuing such men in their employment.

It may further be pointed out that there can be no endorsement for excess of a speed-limit fixed by the Heavy Motor Car Order, unless in the case of a third offence.

Under the London Hackney Carriage Act, 1843, by a special provision it was the practice to issue the summons against the Company calling upon it to produce such and such a man its servant. This was disadvantageous as it made it awkward for the Company to carry out the order where the servant had absconded or been dismissed. Under this practice the Company became advised of what proceedings occurred.

It is thought that it would be of value to the Company if there was a greater measure of co-operation in this matter with the Police, and notice were given of every summons issued against its servants.

IX.—Health of Staff engaged in working Motor-Buses.

No evidence of special disease.

It has been suggested that the work of driving a motor-bus in the streets of London throws too great a strain on a man's constitution, and that in consequence nervous complaints would be prevalent among persons so employed. There is no evidence of this.

In order to test the health of the men, two lines of enquiry are open (1) the record of the causes why men left the service and (2) the record of the sick club as to the complaints in respect of which men were absent from duty. Both have been tried.

Number of men invalided out of the service.

The record of the causes why men left the service during the year 1912 shows that 5 drivers, only, left for the specific reason of sickness, while of conductors, 25 left for the specific reason of sickness, and 13 others for the specific reason that the work was unsuitable. There is nothing conclusive about these figures.

Number of men chargeable to sick club in 1912.

The record of the sick club as to the complaints from which the men suffered during 1912 is of more value. They are set out in the succeeding table.

Complaint.	Drivers.	Conductors.	Total.
Influenza	65	95	160
Injured foot, hand, etc.	69	62	131
Catarrh	38	47	85
Rheumatism	18	48	66
Tonsilitis	19	18	37
Lumbago	19	18	37
Bronchitis	12	21	33
Abscess	15	12	27
Gastritis	8	16	24
Severe cold	8	14	22
Total	271	351	622
All other complaints... (82 varieties)	117	132	249
Total	388	483	871

The number of members belonging to the Sick Club was 1,813 drivers, and 1,567 conductors, or together 3,380, allowing for the fact that the average length of the period of sickness is only short, the incidence of illness or disease is not severe.

This table clearly shows that there are two active causes of illness at work, chiefly exposure to the weather and in a lesser degree the minor accidents of the occupation. The reason why these rank is the carelessness of the staff after a knock causing abrasion of the skin or a cut. Slight wounds get poisoned, and lead up to absences from work.

Cold as a chief source of illness.

One interesting feature is the absence of consumption. There are only three recorded cases. The fresh air may bring colds but it wards off this affliction. Of heart complaints there are none recorded. Of nervous complaints only few. These may be set out:--

Nervous diseases.

Complaint.	Drivers.	Conductors.	Total.
Nephritis	1	1	2
Nervous breakdown ...	—	1	1
Neuritis	2	—	2
Nervous debility ...	1	—	1
Nervous irritability ...	1	—	1
Neurasthenia ...	3	—	3
Shock	1	5	6
Total ...	9	7	16

As to how far these complaints are caused by the man's occupation, there is no evidence, except that it is fair to conclude that the shock was caused by some untimely hazard of the day's work.

On the whole, therefore, the suggestion which has been made is unfounded, and cannot be supported by evidence.

PART IV.

Questions Affecting the Design, Construction and Equipment of the Motor-Bus.

I.—General Description of the B Type of Motor-Bus.

The dominant type of motor-bus employed in the street traffic of London is the "B" type manufactured by the London General Omnibus Company.

It is not easily possible to fully describe in words the detail of this motor-bus. The brief notes included in this section of the proof of evidence comprise the more pertinent particulars. The Chief Engineer of the Company, Mr. W. J. Iden, will add such further explanation as the Committee may desire.

A.—Chassis.

Brief specification of the "B" type engine and chassis.

Brief specification of "B" type engine and chassis.

Weight of Chassis.—The weight of the latest "B" type chassis is between 2 tons 8 cwt. and 2 tons 10 cwt.

Engine.—The engine has four cylinders cast in pairs; bore 110 mm.; stroke 140 mm. The horse-power developed at 750 revolutions is about 28. This is the normal running speed.

Cooling.—The cooling is by means of a vertical tubular radiator, consisting of two bronze plates fitted with 450 copper tubes, with tanks above and below, behind which is a fan driven from the engine.

Clutch.—The clutch is of the cone type, leather, operating direct on a steel flywheel.

Gear Box.—The gear box is of the silent chain type, fitted with three speeds in the forward direction and one in the reverse direction. The reverse only is operated by spur gear.

Front Axle.—This is a solid drop forging of high grade steel, to which are fitted the swivels carrying the road wheels. All wheels run on plain bearings by means of floating bushes.

Back Axle.—The back axle is what is known as a live axle. This consists of a worm drive of a gear ratio of 7·3 to 1. The casing of the axle is of high grade cast steel, into which is securely pressed two steel tubes of high grade material. On the ends of these tubes are hardened sleeves on which the wheels run.

Underframe.—This is made of armoured wood. The flitch plates on either side are of nickel steel, 3-16 in. thick. The wood is best English ash in one piece.

Cross-Members.—These are also of armoured wood, with the exception of those carrying the engine, which are of nickel steel, channel section.

Road Wheels.—The road wheels are of high grade tubular cast steel. The front wheels are fitted with tyres 900 mm. diameter by 120 mm. section. The rear wheels are fitted with twin tyres 1000 mm. diameter by 100 mm. section.

Springs.—The springs are of the laminated type of high grade material and an auxiliary or volute spring in addition is now being fitted. This volute spring comes into operation after about 75 per cent. of the normal load is taken up by the laminated springs. This is done to ensure a better riding bus.

Driving Gear.—This consists of a steering wheel for the hands; a hand brake and a change gear lever to be operated by the right hand; the clutch, the accelerator and a foot brake operated by means of pedals. There is also a horn for the purpose of giving warning.

Acceleration.—The acceleration is controlled by foot pedal only.

Front Axle and Steering.—The front axle consists of a solid drop forging, having its ends forked to receive the swivel or stub axles which carry the road wheels. These swivel axles are pivoted in the forks by vertical pins. Attached to the inner end of each is a horizontal lever. These levers are connected together by a cross connection rod. The offside lever is extended and brought round again into line with the axle.

The steering box, which is securely bolted to the main

frame, contains a fixed worm or screw rotated by the steering wheel. Threaded on the screw is a nut and the effect of turning the screw is to raise or lower the nut. Recessed into the nut are slotted discs. In the slots the vertical arms of a horizontal cross shaft are fitted, on the outer end of which is rigidly fixed a vertical lever. As the nut moves up or down so the lower end of this lever moves forward or backward. The lower end of this lever is connected by a horizontal rod with the end of the lever attached to the offside stub axle.

Steering Rod Connections.—The steering-rod ends, i.e., the part where the connecting rods are joined to the steering levers were originally made up of two cup-shaped pieces bolted together, one on either side of the steering-lever ball. This design, though serviceable, allowed a certain amount of rattle, even when new, and when wear took place between the cups and the ball (partly owing to the bolts slacking off) a space developed between them, and as the cups were a fixed distance apart vibration caused further rattling and noise, as well as shocks on the connections. The only means of reducing this slackness was by taking apart the steering rods and readjusting the cups, so as to bring them up against the ball again.

The new steering-rod end which has replaced the above is made up of two cups as before, one of which is held up against the ball by a stiff spring, preventing rattle when new, and when wear takes place the spring presses the cups together and holds them up against the ball. These springs, by acting as buffers, also have the effect of lessening shocks in the connections. In this way a self-adjusting, shock-absorbing joint is obtained.

Brakes.—There are two independent sets of brakes fitted, one set operated by hand, the other by foot pedal. Both sets of brakes work upon drums bolted direct to the rear wheels, the drums being separate. By this means, the braking stresses are not taken through the transmission gear, and there is this further advantage that should any fracture of the transmission gear occur or should it become inoperative, this does not in any way affect the efficiency of the brake. Each set of brakes consists of a pair of expanding shoes operated by means of cams connected by rods or levers to the operating foot pedal or hand

lever respectively, suitable compensating gear being arranged. The brakes comply with the regulations set out in the Notice to Proprietors and exceed those requirements in that both sets are independent of the transmission gear, and not only one.

CHASSIS DIMENSIONS.—The following are the principal dimensions of the standard "B" type chassis :—

	Actual.
Overall length of chassis -	19ft. $2\frac{1}{4}$in.
Wheel base - - -	12ft. $10\frac{5}{8}$in.
Width across rear hub caps -	6ft. $8\frac{3}{8}$in.
Width across front hub caps -	6ft. $0\frac{7}{8}$in.
Width between rear wheels, centre to centre - -	5ft. 8in.

B.—BODY.

Brief specification of the standard B type body, together with some particulars that are of moment in connection with accidents.

Brief description of motor-bus body.

OVERALL DIMENSIONS OF CHASSIS AND BODY COMPLETE.—The principal dimensions are as follows :—

	Actual.
Length	22 ft. $6\frac{1}{2}$ in.
Width over rear wings	6 ft. $4\frac{1}{2}$ in.
Width at top	6 ft. 8 in.
Greatest width (top handrails)	6 ft. 10 in.
Height from road surface to roof	8 ft. 10 in.
Greatest height (top of front destination board)	12 ft. 6 in.

Further dimensions are shown on a set of drawings which are included (Exhibits X, Y, Z, Aa, Ba). They consist of a side elevation, a front elevation, a rear elevation, a sectional elevation of the body, a plan of the roof seating, and a plan of the interior

seating. These drawings cover the particulars given under the next paragraph. A photograph of a motor-bus is also included (Exhibit Ca).

SEATING ARRANGEMENTS WITH DIMENSIONS.—The body seats 16 passengers arranged longitudinally in the interior, and 18 passengers arranged transversely in pairs on the top on what are termed garden seats."

The material dimensions are :—

INTERIOR—

	Actual.
Length on seat line	11 ft. 3 in.
Average length per seat space (8)	17 in.
Height from floor to roof on centre line	5 ft. 10½ in.
Breadth between seat backs...	4 ft. 8 in.
Width of body at waist line...	5 ft. 4¾ in.

TOP—

Length between front and rear guards	13 ft.
Breadth	6 ft. 10 in.
Length of seats	2 ft. 8½ in.
Width between seats... ...	2 ft. 6½ in.
Height of side guard rails ...	3 ft. 2 in.
Height of side guard rails above seat	1 ft. 8½ in.
Width of landing space at head of stairs	2 ft. 4½ in.

PLATFORM—

Length from front to rear ...	3 ft. 3 in.

All the dimensions given in the preceding paragraphs comply with the Police requirements as set out in the Notice to Proprietors.

WEIGHT OF CHASSIS AND BODY COMPLETE FULLY LADEN. — The weight of the B type motor-bus is within the weight laid down by the Police under clause 8 of the Notice to Proprietors, which reads as follows :—

> WEIGHT.—Omnibuses must be so constructed that the following maxima of weight are in no case exceeded:—
>
> | | | | | |
> |---|---|---|---|---|
> | Unladen | ... | ... | ... | 3 tons 10 cwt. |
>
> Or if the manufacturers prefer—
>
> | | | | |
> |---|---|---|---|
> | Back axle weight laden | ... | ... | 4 tons |
> | Front axle weight laden | ... | ... | 2 tons |
>
> Total weight laden not to exceed 6 tons, when the vehicle is fully laden and in every respect ready for service, 140 lbs. to be allowed for each passenger as well as the driver and conductor.
>
> If the weight is not distributed in the proportion of two-thirds to bear upon rear axle, it must be so arranged or distributed that undue weight is not thrown upon the front, nor must the maximum of 6 tons be in *any* case exceeded.

CENTRE OF GRAVITY OF MOTOR-BUS.—The height of the centre of gravity of a fully-loaded bus above the surface of the road is 5 feet $3\frac{7}{16}$ inches, and of an empty bus 3 feet $9\frac{3}{4}$ inches. The angle to which the bus may be tilted sideways without toppling over is, under fully-loaded conditions, 26 degrees 44 minutes. The worst conditions for a test of this kind would be with the top only fully-loaded and the conductor on top. Under these conditions the angle is 26 degrees 33 minutes, or only very slightly less. A motor-bus in complete working order, but empty, may be tilted to an angle of 35 degrees 57 minutes.

TURNING CIRCLE.—The turning radius of a motor-bus at full lock, that is turning as sharply as is possible, is 18 feet 6 inches on the inner side, and 29 feet on the outer side. In order to give a clearer idea of these sizes in relation to street widths, an illustration of a bus actually turning is given (Exhibit Da).

Overhang of a Motor-bus.—Various points have been raised in this connection, and they are dealt with here under three conditions.

First.—With both wheels flush with the kerb and a road of normal camber; then the projections over the pavement are :—

Hub cap, front wheel	...	$4\frac{1}{16}$ inches.
Hub cap, rear wheel	...	$2\frac{3}{8}$ inches.
Side guard rails on top		7 inches.

If the camber is increased to the maximum permitted, then the overhang of the top of the bus at its widest point extends to 10 inches.

Second.—Where the bus is pulling out from the kerb from the first position. In this case the swing of the bus causes the platform to project over the kerb to a maximum of 8 inches. A photograph in illustration of this is included (Exhibit Ea).

Third.—Where the bus is backed up against the kerb until both the rear wheels are in contact with it. In this case the overhang is 6 feet 9 inches.

It seems almost needless to remark that buses in actual working do not approach close to the kerb, but preserve as far as possible a distance of 18 inches at the least, and that in any case buses do not back up against the kerb. These various figures are of moment only in the case of bad skidding.

It may be noted that by the adoption of a new pattern of hub caps, the amount of projection has been reduced by about 3 inches. The existing hubs do not project as much as do those of an ordinary horse-drawn vehicle.

II.—Speed and Speed Recorders.

Range of speed of a motor-bus.

The speed of the motor-bus depends upon two factors, the ratio of the gears used in transmission and the speed in revolutions at which the engine runs. The normal speed is 750 revolutions per minute. While the engine is constructed to run at this speed in revolutions which, on the third or highest gear, gives a working speed of 11·62 miles per hour, there is a reserve of power provided in order to attain a reasonable speed on gradients or on bad roads; that is to say, the engine can run at a greater number of revolutions, and this is necessary on the first and second speeds to attain to even less than 12 miles per hour.

The following table gives the resultant speeds in miles per hour for different rates of revolution with each gear based upon new tyres compressed by full load and a level road :—

Revolutions per minute.	Speed in miles per hour.		
	1st speed.	2nd speed.	3rd or full speed.
720	3·57	6·20	11·16
750	3·72	6·46	11·62
800	3·96	6·88	12·39
900	4·46	7·75	13·95
1000	4·96	8·61	15·50
1100	5·45	9·47	17·05
1200	5·93	10·33	18·59

Mechanical limitations to the speed of a motor-bus.

In so far as gearing has any control over the speed of the motor-bus, the present motor-buses are geared down to the legal maximum speed. If the running speed is to be further restricted it can only be by cutting out the accelerator and governing the number of revolutions of the engine.

There are three reasons against this;—

1. At the lower gears, the motor-bus would not be able to approximate in the least to the authorised speed as is shown by the table.
2. The efficiency of the motor-bus would be impaired by its inability to accelerate and clear off in cases of necessity.
3. The reserve of power necessary for negotiating gradients or unsatisfactory roads would be lost.

Speed recorders.

Assuming then, that the regulation of speed is not a practicable proposal, the next question that arises is whether it is not possible to give some satisfactory record of the speed at which the motor-bus is running at any given time.

Much has been made of a provision requiring the motor-bus, in default of its being geared down in such a manner that it cannot exceed the speed limit, to be equipped with a device that would give audible warning when that speed was exceeded.

Defects in speed recorders.

This again is not a practicable proposal. Already the matter has been discussed before this Committee, and the experience of the London General Omnibus Company only confirms that of previous witnesses as to the—

1. Unreliability of all devices so far submitted for trial.
2. Lack of protection against tampering to which they would be subject.
3. Ease with which they can be disconnected and thrown out of service.

Objections to speed recorders.

The Company would also associate themselves with the expressions of dissatisfaction which certain phases of working to arise out of their use must create. For instance, a driver may be tempted to run at a speed too great for the circumstances of the moment simply because the warning is not sounding. Or again, the effect such a device will have in stereotyping speeds. The traffic conditions of the streets of London call for an infinite variety of speeds, not only in certain streets, but at certain times in those streets, and not other times. Flexibility of speed is the only real safeguard that the conditions of the moment and the place may be adequately and properly met. There are occasions of emergency when it is desirable that the speed limit should be exceeded if by so doing accident may be avoided or its consequences minimised.

Confusion would arise in the identification of the vehicle originating the disturbance to be caused by the sounding of the warning, and in the distinguishing of the speed warning from the other classes of warnings given by power-driven vehicles of all kinds.

Unreliability of speed recorders.

The real objection to such devices, which has not so far been clearly put before the Committee, is the fact that they cannot be made to accommodate themselves to the differing conditions of the vehicle on which they are fixed.

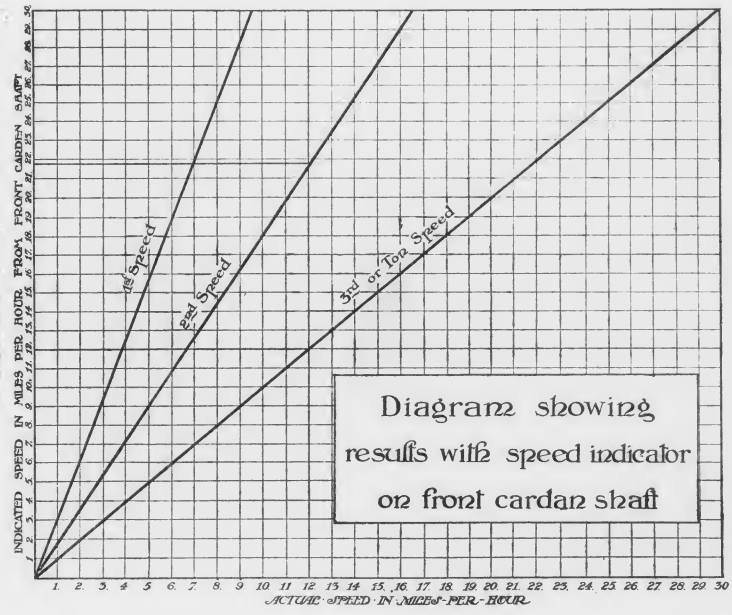
Due to variation in wheel diameter.

Such a device may be worked from the road wheels or from the rear propeller shaft which drives them. In either case it is the circumference of the wheel which determines the distance element in the speed. Now this distance element is not fixed. The wheel is shod, in compliance with the statutory requirements, with rubber tyres. Rubber tyres are subject to compression, varying in amount with the load. They are also subject to fairly rapid wear. The effect of this variation in the circumference of the tyre on the indicated speed is shown in the diagram and table included (Exhibit Fa).

Due to variation in gears.

Or such a device could be worked on the engine or front propeller shaft, but in this case it would have to be set to control the highest gear, with the result that when the motor-bus was running on the lower gears the speed would be restricted to about 3·7 miles per hour for the first gear, and to about 6·5 miles per hour on the second gear.

The following diagram illustrates the operation of the device in this case :—



On these facts it would clearly be impossible for the police or any other public authority to take action against a driver in any spirit of fairness or justice without having definite knowledge as to a number of minute factors governing the situation. That is to say the provision of such a device and the determining of a penalty for an offence in connection with it would be so much waste paper.

Speed recorders fitted to learners' buses.

To state these facts is not to object to a speed recorder in itself. Speed recorders are fixed to some of the learners' buses. These are the buses upon which such devices are tried, and they are of some value in assisting the new men to judge approximately at what speed they are travelling. What is objected to, is the use of a speed recorder as a definite measure of speed when it is known not to be such a measure, and to attach to a breach, determined by so fallible an instrument, penal consequences.

The most satisfactory way of judging speed is a relative measure based on the steady and known speeds of other classes of traffic in the roads, particularly the horsed traffic. By experience it is thought that the men become reasonably accurate judges of the speed.

III.—The Maintenance of the Motor-bus.

The maintenance of the motor-bus in good running order and condition may be considered in three ways :— The three stages in maintenance.

A. The day-to-day inspection ;

B. The periodical rest-day for overhaul ;

C. The annual refit.

A. The Day-to-Day Inspection of the Motor-Bus.

The driver of a motor-bus is required to present himself for duty at the garage not less than 20 minutes before the advertised time of his departure on service. He books on and obtains from the foreman driver a running-sheet in the attached form. (Exhibit Ga.) Daily inspection by drivers.

His first duty is to examine the Driver's Report Book and ascertain what was booked against the bus allotted to him on its last day's work. He must then satisfy himself that any subject of complaint has been properly rectified and that the motor-bus is in fit running order. He has to sign on the back of the running-sheet that he has gone through this routine, among other things.

There are many other points upon which he is required to satisfy himself as to the fitness of the motor-bus for service. For the more important of these items he must also sign on the back of the running-sheet.

It is the duty of a driver on bringing his bus in at night to inspect it before leaving the garage, and to enter up in the Drivers' Report Book any defects coming to his notice, or any information relative to the working of the bus which he thinks deserves attention If he finds difficulty in explaining what is wrong he must interview the garage foreman on duty. If he has no remark to make, he must still sign for the bus as O.K. before leaving the garage. Recording of failures and defects.

It is the duty of the night foreman to refer continually to the Drivers' Report Book (Exhibit Ha), and as the motor-buses come in from their day's work to make provision amongst the staff for the execution of all needed repairs and adjustment.

Garages complete in themselves.

Each garage is equipped with all that is necessary as a complete repair shop, in addition to being supplied with complete sets of spare parts, which are interchangeable throughout all the motor-buses of the type. Each garage is staffed by specialised employees capable of dealing with all the various parts of the motor-bus and its mechanism which require attention, such as brake fitters, steering gear fitters, engine fitters, coach builders, greasers, etc. Each garage is in the charge of a superintendent competent to deal with every sort of mishap that may occur to the motor-bus, and he has under him a general foreman for day work and a night foreman, so that there is always someone definitely in charge of the work of inspection and repair.

It is the duty of the night foreman to make a general survey of all the motor-buses in the garage, and to see that the work to be done on each is completed, and that the Drivers' Report Book is duly signed by the employee to whom he allotted the task of carrying it through.

The next day the Drivers' Report Book is posted to summary sheets for each motor-bus, termed the Driver's Report and Dock Overhaul Sheet (Exhibit Ia), upon which the record of that bus is kept pending the periodical overhaul.

This completes the regular nightly procedure, and leads up to the second stage of maintenance.

Garages equipped and in service.

The number of garages at 31st January, 1913, was 31, two of which were just opened and without a full complement of motor-buses, and two were provincial ones of small size. The number of motor-buses licensed was 2,550; the average number on the streets 2,181; the difference being withheld for overhaul or repairs. The largest garage held 155 buses; the smallest 15. The normal size of a garage is 80-120 buses. The staff employed upon the ordinary maintenance and upkeep of buses is as follows:—

GARAGE STAFF. Garage staff.

January 31st.

GRADE.	NUMBER.	SECTION TOTALS.
Superintendents	28	
		28
General Foremen	31	
Night Foremen	28	
Drivers' Foremen	28	
Washers' Foremen	27	
		114
Chief Clerks	29	
Assistant Clerks	27	
Third Clerks	16	
Office Boys	30	
		102
Head Storekeepers	27	
Assistant Storekeepers ...	56	
		83
Relief Clerks	3	
Relief Storekeepers	5	
		8
Gatekeepers	22	
		22
Fitters		
Mechanics	3,070	3,070
Cleaners, etc.		
TOTALS ...	3,427	3,427

B.—THE PERIODICAL REST DAY FOR OVERHAUL.

Apart from anything which may have happened that would call for immediate attention, the motor-bus is withdrawn from service once every fourteen days for overhaul. This is an approximate interval. The fortnightly overhaul of the motor-bus.

The dock overhaul sheet is posted on the bus giving the fitter particulars of all complaints made regarding the working and all defects developed in the machinery since the last overhaul.

All these points are checked up and in addition the engine is stripped, the wheels removed, the steering and brakes taken down

and all the dismantling done which will enable the fitter to completely fill up the particulars set out on the left-hand side of the form and to certify that all cause of complaint against the bus has been removed.

Upon the completion of the overhaul the bus is taken out and tested and a certificate of fitness signed before it is placed back in the number of running buses.

C.—The Annual Refit.

The annual refit.

Once every year, as the police licence falls in, the motor-bus is withdrawn from service. The body is taken off the chassis and sent to the coach factory, where it is entirely renovated and repainted. The chassis is completely stripped and every part thoroughly examined and brought up to, as nearly as possible, new condition.

When the chassis is again assembled and complete it is thoroughly tested as for a newly manufactured one and sent on to the coach factory to have the body fitted. When this is done it is again tested and subsequently submitted to the police for licence for a further period of a year.

Here again it has to be approved and passed as for a new bus, except that it has not to pass the Noise Committee.

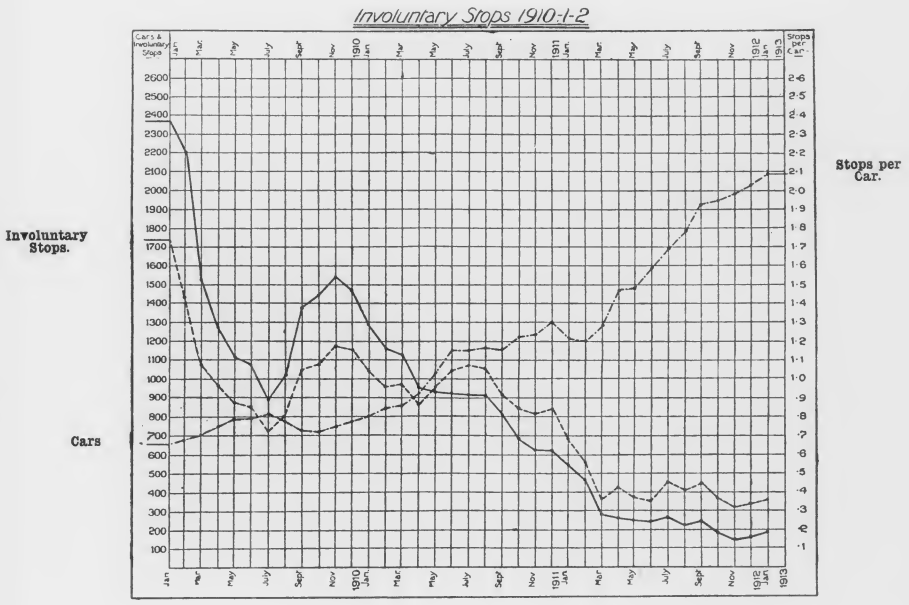
By these means the fleet of motor-buses is kept in a thoroughly reliable and efficient state.

Efficiency of the maintenance proved by statistics of results.

A record is kept of the number of involuntary stops made. The results for the last three years work out as follows:—

Year.	No. of stops	Average per motor-bus per week.
1910	54,706	1·43
1911	46,232	·89
1912	21,553	·26

A diagram giving monthly details is shown below, and illustrates the very marked improvement, which has taken place.



Or again, a record is kept of the number of miles run by motor-buses short of the appointed schedule. The results for the last three years work out as follows :—

Year.	Percentage of miles lost.
1910	3·9
1911	2·5
1912	·5

IV.—Police Inspection of the Motor-bus.

Police Inspection of the motor-bus.

In addition to the inspections outlined in the last preceding part of this proof which are undertaken by the Company in its own interest, the police keep the public licensed vehicles under inspection to ensure that they are at all times in a fit state to ply for hire, both by visits to the garages and by surprise inspections in the streets.

The inspectors and police specially allocated to this work were referred to in the evidence put before this Committee by Superintendent Bassom of the Public Carriage Office.

Procedure.

The method of procedure adopted by the police is to issue notices which have the effect of preventing the use on the streets of the motor-buses in respect of which they are issued. The police have to give notice to the registered proprietor of the motor-bus. In the case of London General Omnibus Company this is the Chief Engineer. The notices are of two kinds. The first kind is a positive stop which prevents the vehicle in respect of which it is issued being used in the public service until it has been inspected and again passed by the police. The second kind is what is known as a "two-day stop," that is to say, it calls attention to some irregularity and requires it to be remedied within two days. If the necessary change or work is executed within two days, the vehicle in respect of which it was issued returns to public service without the formality of being re-inspected.

The stop notices are sent out from head office to the garages with a form attached calling for report and for particulars of the work that is necessary to be done to remedy the case. The forms are returnable to head office, where they are the subject of record and consideration.

When a motor-bus is submitted for passing after a positive notice has been received or a two days' notice has lapsed, the form of notice is presented to the police and cancelled if they are satisfied that the case has been fully remedied.

The number of police stops received by the London General Omnibus Company has been steadily diminishing. The record for the last three years is as follows :— Police stops decreasing.

	1910.	1911.	1912.
Number of police stops—			
Positive - - -	8,752	7,760	7,678
Two-day - - -	2,306	2,141	2,607
Total - -	11,058	9,901	10,285

The average number of motor-buses stopped during each day or part of a day fell from 1 in 25 in 1910 to 1 in 41 in 1911, and to 1 in 59 in 1912.

Further, in order to show the causes in respect of which police notices were served upon the Company, an analysis has been made of those received in 1912. Causes of Police stops.

NUMBER OF STOP NOTICES, 1912.

	Positive stops.	Per cent. of total.	Two-day stops.	Per cent of total.	Total.	Per cent. of total.
Undue noise - -	6,165	80	305	12	6,470	63
Engine noisy - -	168	2	254	10	422	4
	6,333	82	559	22	6,892	67
Brakes defective -	304	4	—	—	304	3
Steering defective -	479	6	76	3	555	5
Wheels defective -	165	2	44	2	209	2
	948	12	120	5	1,068	10
Oil or petrol leaking -	145	2	15	—	160	2
Springs weak -	68	1	100	4	168	2
Cushions dirty -	40	1	212	8	252	2
Lights defective -	4	—	549	21	553	5
Tyres defective	—	—	308	12	308	3
Miscellaneous -	140	2	744	28	884	9
	397	6	1,928	73	2,325	23
	7,678	100	2,607	100	10,285	100

Of these causes two-thirds relate to noise and concern chiefly the older type of vehicles, only a tenth represents anything of an apparently serious nature, and in these cases it is usually nothing worse than the need of some minor adjustment. The significance of police stops.

In order to make it quite clear that a police notice has not any serious significance, it may be stated that the notices are dealt with by way of correspondence, and when received by the Company usually date back to inspections made 3 or 4 days previously. There has never been, in the recollection of the Company's officers, a case in which, within recent years, a motor-bus has been peremptorily ordered off the streets as a source of danger.

PART V.

Questions Affecting the Traffic Operation of Motor-Bus Routes.

I.—Organization for the Control of Traffic.

A twofold organization.

The organization for the control of traffic falls into two parts corresponding to the two principal departments under which the business of the London General Omnibus Company is conducted, namely, the Engineering and Traffic Departments.

The Engineering Department is responsible for the maintenance and efficiency of the motor-buses and as being concerned in this aspect of the work, the drivers are included under this department. The Traffic Department is responsible for the routes, services, fares and arrangements for the operation of the motor-buses and as being concerned in this aspect of the work, the conductors are included under this department. Each department is independent of but supplemental to the other and the detailed organization of each is to be separately considered.

The control of drivers in the garages.

Drivers are attached to a given garage and usually live adjacent to it. The garage is under the control of a Garage Superintendent, who has under him a Foreman Driver for the express purpose of assisting him in the exercise of supervision over the drivers. The Garage Superintendent has full disciplinary power to reduce in rank, suspend or discharge any driver, subject always to an appeal to the officers in order of seniority up to and including the General Manager. The motor-buses are allocated to the men, so that each knows his own bus and keeps it. It is usual for the drivers to rest during the day their bus is withdrawn for overhaul. Other buses are substituted only on the occasion of the annual refit. The allocation is made by the foreman driver from among the running buses of the garage.

The control of drivers on the road.

In addition to the supervision in the garages there is a Road Department attached to headquarters. This is in charge of an official of the company and comprises eight Road Inspectors. The duties of these men are :—

1. To tour the whole area covered by motor-bus routes with a view to determining the condition of the roads traversed.

2. To issue speed restrictions when in their opinion they are desirable to secure the safe and smooth passage of the bus.

3. To check all diversions of route due to road repairs, police regulation or extraordinary traffic.

4. To check the speed at which motor-buses work, and to report irregularities.

5. To inspect motor-buses for defects or mechanical irregularities when in actual service.

6. To report drivers for irregularities in working, such as carelessness in turning corners, failing to stop when hailed, smoking on duty, and to investigate complaints against drivers sent to headquarters.

For the more convenient working of this organization London has been divided into four districts to each of which two road inspectors are allocated, so that throughout the day there is always one on duty in each district.

A dual system of control.

Hence it will be seen that within the engineering department itself, there is a dual system of inspection and report, which secures that the discipline at every point is maintained at a high standard. As a further means of securing this, as well as uniformity at all points, the Road Inspectors exchange districts at the end of each month.

General Organization for the control of traffic.

The Traffic Organisation for the control of motor-buses in service is as follows :—

At the head of the control staff is the Road Superintendent who is responsible for the organisation, supervision and discipline of the road staff.

To him report three Assistants, each charged with a definite part of the whole work.

As to conductors.

First of these is the Assistant Road Superintendent, responsible for the selection, training and discipline of the conductors. For this purpose he has a Chief Instructor immediately under him to take over the employment and training of new men, and fifteen District Road Inspectors with eleven Assistants, who between them have parcelled out the whole of the area covered by motor-bus

routes. Each District Road Inspector has under him Yard Inspectors for the garages in his area who see to the supply of conductors for each day's work, and are also responsible for the money taken by them in the day. These are the officials in immediate charge of the conductors, and altogether there are 63 in this rank.

Control of conductors in the garage.

The conductors are attached to garages in the same way as the drivers, and are under the immediate charge of the Yard Inspector of the garage at which they are stationed. The Yard Inspector acts in relation to conductors as the deputy or assistant of the District Road Inspector. The District Road Inspector is the chief out-door official of the Traffic Department. He is responsible for the actual discipline of the staff, with full power to caution, reduce in rank, suspend or discharge at his discretion.

Each man has a right of appeal in the first instance to the Road Superintendent or his assistant, and from him to the officers in order of seniority, with a final appeal to the General Manager, as in the case of drivers.

As to regulation of motor-buses and time-keeping.

Then he has Regulators for the prevention of congestion and ensuring the proper spacing of motor-buses on the road, and Timekeepers for recording the times at which motor-buses pass a given point. Of these there are 44 Regulators and 222 Timekeepers

The Timekeepers are placed at the terminals and are responsible for the orderly conduct of the men at these points and the punctual starting of the buses upon their trips. Other Timekeepers are placed at midway points on a route.

Altogether 357 persons are employed in the Traffic Department in the checking of the motor-bus services, and in the discipline of the staff engaged in them. These are in addition to the 67 persons employed in a similar capacity by the Engineering Department.

As to tickets, cash, etc.

The second Assistant to the Road Superintendent is charged with the supervision of the tickets, waybills, returns, and generally the commercial side of the business as it affects conductors. To assist him there are four Chief Ticket Inspectors, and 137 Ticket Inspectors.

As to alterations and improvements in service.

The third Assistant is charged not so much with the control and discipline as with the checking of the routes worked and the services provided. He is concerned with such matters as the suitability of the route from a traffic point of view, the diversions or extensions that may be desirable, the adequacy of the service running on a route and the augmentation or diminution of it. To assist him, there are 8 Route Inspectors.

Principles underlying the organization.

It has been accepted as a principle that the responsibility for attending to the full and proper execution of the orders issued by the Traffic Department with regard to the routes to be worked and the services to be provided should be distinctly severed from the responsibility for issuing those orders and determining what routes shall be worked and what services shall be provided.

The second principle underlying the organisation is the acceptance of a territorial basis of control rather than a route basis, though upon the final wisdom of this an open mind is to be preferred.

Lastly, if anything, the control staff may be considered, excessive. Altogether, it consists of 582 persons, or one to every 14 or 15 persons employed.

The check on the services provided.

The twofold basis of the organization extends to the questions involved in the laying-out and maintenance of the motor-bus services. The Traffic Department consider the recommendations of the Road Staff in determining new schemes, but in addition, all new schemes together with the satisfactory character of existing schemes are independently considered at headquarters from the data supplied by another staff. This consists of a chief clerk, eight checking clerks, two inspectors and forty-four men.

An independent check.

This staff is worked entirely independently of the Traffic Department and in criticism of its efforts so that there may be no point overlooked or anything left undone for want of knowledge or for lack of energy.

The method under which this staff is worked is as follows.

Each week an area is selected and the men working in two shifts, one early and one late, are stationed at different points in that

area to record the number of passengers, the time of passing, and the route worked by each bus in each direction. Each point is checked for two or three days together and averaged to ensure accuracy, and to avoid the minor and unimportant variations that occur.

The points chosen for test are those at which some change takes place, either in the direction of the flow of traffic or in the volume of service known to be provided. At heavy points the duties of checking are shared over two or three or four men, sometimes for each direction, and sometimes for each of certain allotted services.

All these results are sent into a special office and plotted on to diagrams by the checking clerks. These are compared one with another, and in this way pictures are composed of each route from end to end, or pictures are composed of the results of all routes passing through a given street.

These pictures show not only the adequacy of the service, but also reflect the efficiency with which it is maintained. They are passed on to the Traffic Department for their guidance.

II.—The Timing of a Route.

Basis of timing.

The timing of motor-buses is one of the most important points connected with the working of motor-buses with safety.

The method of timing has been perfected with the course of years. It had four stages in its history :—

First stage, average speed.

1. In horse-bus days, times were worked out on the basis of 6 miles per hour on open sections of road, and 5 miles per hour on closed sections of road. With the advent of the motor-bus the same system was continued, but the speeds were increased to 9 miles per hour on the open sections and 6 miles per hour on the closed sections.

Second stage, practical test.

2. This theoretical basis did not work out well, and it was then decided to take practical tests of the time occupied on the journey as a whole, and check the office figures by them. The final timing became the result of a compromise between theory and practice.

Third stage, determination of intermediate figures.

3. Objections arose on this second stage. A driver had only a poor idea as to the place which he was keeping in the schedule owing to the lack of intermediate times. If he thought he was late, he was tempted to hurry, and if he was early, he still proceeded to the stand and had a longer lay over. The effects of delay or accident could be covered up by working the rest of a journey at a higher rate of speed. Recognising the defects in the system, the Company entered upon a fresh timing of all the services and the times at intermediate points were determined.

Fourth and last stage, adjustment to varying traffic conditions

4. Various causes contributed to make this third timing unsatisfactory, such as the varying traffic conditions at differing hours of the day, and the varying speed capacity of the differing types of motor-bus then employed. The whole question of the timing was reopened in 1911, and the timing of the routes worked out for three periods of the day, in the morning rush, throughout the day, and in the evening rush. In order to simplify as much as possible these time schedules, the differing types of motor-bus were collected together on to particular routes.

The method of timing as completed needs to be considered under two aspects; firstly, from the aspect of an entirely new route; secondly, from the aspect of a route that is already being worked. **The method of timing employed.**

For a route to be entirely new is something of a rarity. Commonly only part of a route is new. To commence with the distance is measured, and an inspection made to obtain a general idea of the traffic conditions to be encountered. On this a provisional time table is prepared, and, if necessary, a special circular of instructions to the drivers and conductors, calling attention to dangerous or exceptional points at which a reduced speed is thought desirable. (Exhibit JA.). Then the motor-buses commence to run. **For a new route.**

This leads to the second aspect. Immediately a motor-bus service commences to run, arrangements are made to test the timing. These tests are taken by a representative of the Company (the foreman driver at the interested garage) and a representative of the men (elected for each garage). These men ride upon the front or inside motor-buses engaged in the ordinary operation of the route, and take complete logs of the journeys. Each representative acts independently of the other. **On an existing route.**

The reports are then considered by a Timing Committee at headquarters and averaged out. This Committee has attached to it three special inspectors who are sent out to take such supplementary tests as may be required to clear up any discrepancies in the records. In the end it issues an authoritative timing which, after being confirmed by the management, comes into effect for the route. The Timing Committee has become a permanent institution and is always available to consider and report on questions affecting its particular labour whether arising on representations of the staff, the public, or the management. **A Timing Committee.**

The table below gives for every regular week-day route the distance, time allowed on the journey at different periods of the day, and the average scheduled speed.

The Sunday times are the same as the week-day times, except that the times applying before 9.0 a.m. on week-days apply throughout the day on Sundays.

Service No	Route.	Length of route.	Times allowed.			Average speeds including stops.		
			Before 9-0 a.m. and on Sundays.	Between 9-0 a.m. and 7-30 p.m.	After 7-30 p.m.	Before 9-0 a.m. and on Sundays.	Between 9-0 a.m and 7-30 p.m	After 7-30p.m.
		Miles.	Minutes.	Minutes.	Minutes.	Miles per hour.	Miles per hour.	Miles per hour.
1	Kilburn and Tower Bridge	7·40	53	60	58	8·3	7·4	7·6
2	Golder's Green and Ebury Bridge	7·2	46	50	47	9·6	8·6	9·2
3	Brixton and Camden Town	6·95	49	50	44	8·5	8·3	9·5
4	Finsbury Park and Bermondsey	8·05	56	62	56	8·8	7·8	8·8
5	Putney and Stroud Green	10·9	72	77	72	8·4	7·8	8·4
6	Kensal Rise and Victoria Park	10·05	73	80	73	8·2	7·5	8·2
6A	Kilburn and Shoreditch	6·9	50	59	50	8·2	7·0	8·2
7	Liverpool Street and Wormwood Scrubbs ...	7·45	54	66	53	8·3	6·8	8·4
8	Willesden and Old Ford	11·75	76	95	76	9·3	7·4	9·3
9	Barnes and Liverpool Street	9·45	63	73	63	9·0	7·7	9·0
9A	Barnes and Piccadilly Circus	4·1	28	31	28	8·8	8·0	8·8
10	Wanstead and Elephant and Castle	8·75	59	63	59	8·9	8·3	8·9
11	Hammersmith and Liverpool Street ...	8·5	61	66	61	8·3	7·7	8·3
11A	Wormwood Scrubbs and Liverpool Street ...	10·3	72	77	72	8·6	8·0	8·6
12	Turnham Green and Peckham	11·9	81	84	83	8·8	8·3	8·6
13	Hendon and London Bridge	10·1	71	76	75	8·5	7·9	8·1
14	Putney and Hornsey Rise	10·65	72	76	72	8·8	8·4	8·8
15	Putney Common and East Ham	15·15	106	114	106	8·5	7·9	8·5
16	Cricklewood and Victoria	5·4	35	38	35	9·2	8·5	9·2
17	Ealing and London Bridge	10·3	70	79	71	8·8	7·8	8·7
18	Willesden and London Bridge	9·85	71	76	71	8·3	7·7	8·3
19	Clapham Junction and Highbury	8·85	60	66	60	8·8	8·0	8·8
20	Shepherd's Bush and West Norwood ...	11·0	72	80	75	9·1	8·2	8·8
21	Wood Green and Greenwich	13·25	86	90	86	9·2	8·8	9·2
22	Putney and Homerton	12·1	85	93	85	8·5	7·8	8·5
23	Acton Vale and Barking	15·9	114	121	115	8·3	7·8	8·3
24	Hampstead Heath and Pimlico	6·05	44	48	42	8·3	7·6	8·6
25	Seven Kings and Victoria	13·8	92	104	92	9·0	7·9	9·0
26	Kensal Rise and Hackney	10·65	75	82	75	8·5	7·8	8·5
27	Twickenham and Highgate	15·15	102	105	102	8·9	8·6	8·9
28	Wandsworth and Golder's Green	8·85	59	59	60	9·0	9·0	8·8
29	Victoria and Southgate	11·05	69	77	69	9·6	8·6	9·6
30	Putney and King's Cross	8·35	60	62	60	8·3	8·0	8·3
31	Chelsea and Swiss Cottage	5·75	40	40	41	8·6	8·6	8·4
32	Ladbroke Grove and Charing Cross	4·9	35	38	35	8·4	7·8	8·4
33	East Sheen and Liverpool Street	11·2	73	83	73	9·2	8·1	9·2
34	West Norwood and Liverpool Street ...	6·7	43	47	43	9·3	9·0	9·3
35	Walthamstow and Elephant and Castle ...	9·55	62	67	63	9·2	8·5	9·1
35A	Walthamstow and Elephant and Castle ...	9·55	62	67	63	9·2	8·5	9·1
36	West Kilburn and Catford	12·9	78	78	78	9·9	9·9	9·9
37	Herne Hill and Hounslow	13·6	91	91	96	9·0	9·0	8·5
38	Leyton and Victoria	9·35	64	69	64	8·7	8·1	8·7
39	Victoria and Sidcup	12·85	78	78	78	9·8	9·8	9·8
40	Elephant and Castle and Upton Park ...	7·95	57	61	57	8·4	7·8	8·4
41	Tufnell Park and Old Ford	8·05	57	61	57	8·5	8·0	8·5
42	Finsbury Park and Tower Bridge	7·25	45	50	45	9·7	8·7	9·7
43	Muswell Hill and London Bridge	8·6	55	58	55	9·4	8·9	9·4
44	Putney Common and Highbury	10·3	70	75	70	8·8	8·2	8·8
45	Clapham Common and Swiss Cottage ...	9·8	67	69	67	8·8	8·5	8·8
46	Willesden and Victoria	7·65	52	55	52	8·8	8·3	8·8
48	Tottenham and Merton	15·35	103	111	103	8·9	8·3	8·9
49	Shepherd's Bush and Streatham	9·8	70	70	70	8·4	8·4	8·4
50	Shepherd's Bush and Liverpool Street ...	6·6	46	57	57	8·6	7·0	7·0
59	Oxford Circus and Croydon	14·4	80	85	79	10·8	10.2	10·9
62	Highgate and Waterloo	5·3	36	39	36	8·8	8·2	8·8
65	Fulham and Stoke Newington	10·5	71	75	71	8·8	8·4	8·8
66	Tooting and Willesden	11·3	69	73	69	9·8	9·3	9·8
67	Leyton and Poplar	6·25	45	45	45	8·3	8·3	8·3
68	Camberwell and Chalk Farm	5·75	38	43	38	9·1	8·0	9·1
69	Poplar and Plumstead	5·8	38	38	38	9·2	9·2	9·2
71	Ealing and Surbiton	11·6	75	75	75	9·3	9·3	9·3
74	Barnes and Camden Town	7·7	52	52	52	9·0	9·0	9·0
76	Stoke Newington and Victoria	6·95	50	50	50	8·3	8·3	8·3
77	East Hill and King's Cross	7·5	52	55	52	8·6	8·2	8·6
79	Kingston and Esher	4·0	24	24	24	10·0	10·0	10·0
80	Ealing and Northfields	3·25	23	23	23	8·5	8·5	8·5
81	Hounslow and Windsor Castle	12·85	68	68	68	11·2	11·2	11·2
82	Heston, Hounslow and Staines	6·7	39	39	39	10·3	10·3	10·3
83	Golder's Green and Kilburn	6·6	43	43	43	9·2	9·2	9·2
84	Golder's Green and St Alban's	15·9	88	88	87	10·8	10 8	10 9
85	Putney and Roehampton	2·2	14	14	14	9·4	9·4	9·4
86	Barking and Barking Side	2·6	18	18	18	8·7	8·7	8·7
87	Colney Hatch and Clapton	8·4	60	60	60	8·4	8·4	8·4
93	Mile End and Romford	11·15	66	66	66	10 1	10·1	10·1

SPECIAL SUNDAY SERVICES.

Service. No.	Route.	Length of route. Miles.	Time allowed. Minutes.	Average Speed including stops Miles per hour.
1	Tower Bridge and Edgware	13.05	90	8.7
2	Ebury Bridge and North Finchley ...	11.00	67	9.8
5	Wimbledon and Stroud Green	13.45	91	8.9
13	Hendon and Charing Cross	7.80	51	9.1
15	Putney Common and Plaistow	13.10	92	8.5
17	Ealing and East Ham	16.90	110	9.2
23	Marble Arch and Rippleside	13.05	86	9.1
29A	Cockfosters and Victoria...	13.65	87	9.4
30	King's Cross and Kingston	13.95	97	8.6
35	Camberwell Green and Chingford Mount	12.20	78	9.4
38	Victoria and Epping Forest	14.10	94	9.0
49	Shepherd's Bush and Thornton Heath ...	13.05	90	8.7
59	Camden Town and Croydon	14.40	90	9.6
83	Golder's Green and Edgware	5.95	35	10.0
85	Putney Bridge and Kingston Hill ...	5.20	35	9.0
86	Barking and Barkingside	4.90	30	9.8
100	Stockwell and Whyteleafe	12.75	76	10.0
101	Somerset House and Hampton Court ...	15.95	104	9.2
	(Via Putney) ...	15.95	108	8.8
102	Harrow Weald and Charing Cross ...	13.70	86	9.5
103	Elephant and Castle and Buckhurst Hill	12.55	79	9.5
104	Somerset House and Hampton Court ...	15.05	102	8.8
	(Via Kew) ...	15.05	106	8.5
105	Watford and Kilburn	10.75	72	9.0
106	Oxford Circus and Petersham	10.10	68	9.0
107	Clapham Common and Epsom	11.35	66	10.3
108	Elephant and Castle and Epping Town ...	18.90	110	10.3
109	Golder's Green and Hatfield	15.5	87	10.6

The data included in the preceding table relating to normal weekdays may be summarized in order to give a clear idea of the purport of the many figures. On 22 routes a speed of less than 8 miles per hour is expected during some parts of the day, and on 59 routes a speed of less than 9 miles per hour. On 42 of these latter routes, the expected speed is less than 9 miles per hour at all times of the day. With five exceptions, all the booked times give less speeds than 10 miles per hour. These exceptions are the country routes to Windsor, Staines, St. Albans and Romford.

The average booked times analysed into speeds.

A specimen of the card issued to drivers showing the times of the trips to be performed by each bus with the lay-over times at each terminus is included (Exhibit Ka.), as well as a new type of time card giving details as to the timing on a particular route (Exhibit La.). Before the new type of time card was issued, "stickybacks" were issued for every route to both driver and conductor, and they were to be stuck up at the front and back of every bus. This practice dates back to 1907, and in December, 1911, an entirely new series was issued (Exhibit Ma.).

Time cards.

It may be stated that with whatever care the time allowed on a given route is fixed, it is not to be expected that it will be found to exactly fit the requirements of each trip. The exigencies of traffic on the streets and the number of passengers to be handled continually vary, and with them the time consumed in making the journey. To some extent the lay-over time is to be regarded as a margin left to ensure the punctual working of the motor-bus and not only to meet the convenience of the staff.

Lay-over times.

In order to show to what extent the timing laid down is adhered to, and to show further the extent of the lay-over, a further table is given on the following page. Tests have been taken of the actual time consumed on journeys on some of the routes, and the average results of these journeys have been filled in for comparison. It has not been possible in the time to make an adequate number of tests on all routes.

Service No.	Route.	Length.	Average Working Speed.	Mean Time Allowed.	Average Lay Over.		Average Time Taken including Stops.
					One Terminus	Other Terminus	
		MILES.	MILES PER HOUR.	MINS.	MINS.	MINS.	MINS.
1	Tower Bridge and Kilburn Station ...	7·4	8·1	55	2¼	7	55
2	Golders Green and Ebury Bridge ...	7·2	9·1	48	8½	4¾	47
3	Brixton and Camden Town	6·95	9·1	46	5¼	10	46
4	Finsbury Park and Bermondsey	8·05		58	4	9	
5	Putney and Stroud Green	10·9	8·9	74	8	4½	73
6	Kensal Rise and Victoria Park	10·05		77	9½	5	
7	Liverpool Street and Wormwood Scrubs	7·45	7·7	58	2	5¾	58
8	Willesden and Old Ford	11·75	8·5	82	5	16¼	82
9	Liverpool Street and Barnes	9·45	8·6	66	2¼	10¾	66
9A	Piccadilly Circus and Hammersmith ...	4·1		29	2¼	7¼	
10	Wanstead and Elephant	8·75		60	4¼	9¾	
11	Hammersmith and Liverpool Street ...	8·5		63	9½	2¼	
11A	Wormwood Scrubs and Liverpool Street...	10·3		75	9	2	
12	Turnham Green and Peckham Rye ...	11·9	8·7	83	18½	3	82
13	London Bridge and Hendon	10·1	8·4	72	2	10	72
14	Hornsey Rise and Putney	10·65		73	8¼	3¾	
15	Putney Common and East Ham ...	15·15		112	15¼	5¾	
16	Victoria and Cricklewood...	5·4	9·1	36	2	3	36
17	London Bridge and Ealing Broadway ...	10·3		74	3½	8¼	
18	London Bridge and Willesden	9·85		73	2	11¼	
19	Highbury Barn and Clapham Junction ...	8·85		62	2¼	6¾	
20	Shepherds Bush and Norwood	11·0		76	2	8½	
21	Greenwich and Wood Green	13·25		87	3¾	10	
22	Homerton and Putney	12·1		87	9¼	3	
23	Acton Vale and Barking	15·9	8·1	117	6	22	116
24	Pimlico and Hampstead Heath	6·05		44	2	11	
25	Victoria and Seven Kings	13·8	8·6	96	2	16¼	96
26	Kensal Rise and Hackney Wick	10·65		77	10	5	
27	Twickenham and Highgate	15·15		103	11¼	4¼	
28	Wandsworth and Golders Green	8·85	8·9	59	6½	3¾	59
29	Victoria and Southgate	11·05	9·3	72	2	10¼	71
30	Putney and King's Cross	8·35	8·4	61	3¾	9¼	60
31	Chelsea and Swiss Cottage	5·75	8·7	40	10	4	40
32	Charing Cross and Ladbroke Grove ...	4·9		36	2	8½	
33	Liverpool Street and East Sheen... ...	11·2	8·8	76	2¼	9¼	76
34	Liverpool Street and West Norwood ...	6·7		44	2	10	
35	Elephant and Walthamstow	9·55	9·0	64	2	6¼	64
35A	Elephant and Walthamstow	9·55	9·0	64	2¼	6¼	64
36	Catford and West Kilburn	12·9	9·8	78	2	21	78
37	Herne Hill and Hounslow	13·6	8·7	93	4¼	10	94
38	Victoria and Leyton	9·35		66	3½	15	
39	Sidcup and Victoria	12·85		78	17½	2¼	
40	Elephant and Upton Park	7·95	8·2	58	2	15¼	58
41	Tufnell Park and Old Ford	8·05		58	4½	8	
42	Tower Bridge and Finsbury Park ...	7.25		47	2	10	
43	London Bridge and Muswell Hill ...	8·6		56	3¾	6½	
44	Highbury and Putney Common	10·3	8·5	72	4	8½	72
45	Swiss Cottage and Clapham Common ...	9·8	8·8	68	13½	8	67
46	Victoria and Willesden	7·65		53	2	10½	
48	Merton and Tottenham	15·35	8·8	106	10	5¾	105
49	Streatham and Shepherds Bush	9·8		70	5	5	
50	Liverpool Street and Shepherds Bush ...	6·6		50	2¼	9¼	
59	South Croydon and Oxford Circus ...	14·4		81	10	4¾	
62	Waterloo and Highgate	5·3		37	3	8½	
65	Fulham and Stoke Newington	10·5		72	3½	7	
66	Tooting and Willesden	11·3	9·6	70	5½	8¾	70
67	Poplar and Leyton	6·25	8·4	45	5	5	45
68	Chalk Farm and Camberwell Green ...	5·75		40	6¾	9	
69	Poplar and Plumstead	5·8	9·2	38	5	9½	38
71	Ealing and Surbiton	11·6		75	10¼	5¾	
74	Barnes and Camden Town	7·7		52	2	9½	
75	Victoria and Stoke Newington	6·95		50	2	6½	
77	East Hill and King's Cross	7·5	8·1	53	6	4¾	55
79	Esher and Kingston	4·0		24	3	3	
80	Ealing and Northfields	3·25		23	2	2	
81	Hounslow and Windsor	12·85		68	8	30	
82	Hounslow and Staines	6·7		39	6	6	
83	Golder's Green and Kilburn	6·6		43	6¾	2	
84	Golder's Green and St. Albans	15·9		87	28	7	
85	Roehampton and Putney Bridge	2·2		14	6	6	
86	Barkingside and Barking Station ...	4·9		18	5	9¼	
87	Colney Hatch Lane and Clapton... ...	8·4		60	7¼	10	
93	Mile End Station and Romford	11·15		66	3¾	4	

In taking tests for the purpose of the preceding table, opportunity offered for examining the speed on short sections of road for comparative purposes. For instance, the average speed of working from Kingsway in the Strand to Liverpool Street was only 5·8 miles per hour against 8·2 miles per hour between Hammersmith Broadway and Kensington Church. Or, the average speed or working between Victoria and Marble Arch was 8·4 miles per hour against 10 miles per hour in the wide part of the Edgware Road between the Harrow Road and Kilburn. In Cheapside the average speed fell to as low as 3·25 miles per hour. It is a matter for interesting conjecture how far the provision of a statutory speed limit would have any effect in securing a better result. It seems evident that the safe speed of working is itself fixed by the volume of traffic and conditions of the road, except for those who are heedless of these considerations altogether. A speed limit may not even deter them. By leaving the matter free, traffic is not hampered at times when the circumstances are easier.

Traffic conditions as setting up a natural speed limit.

When the timing is laid down, the question arises as to the steps which are taken to ensure that it is observed.

Check on the keeping of time.

The conductors, as part of their ordinary daily routine, are required to make out a running sheet showing the times at which the motor-bus under their control leaves the terminals of the routes. To ensure accuracy in the filling in of these details, the running sheet is initialled by the timekeeper. A specimen of a running sheet is included (Exhibit Na.).

The conductor's running sheet.

The timekeepers themselves record the times of the motor-buses arriving at and leaving the stand or point to which they are allotted. On certain routes timekeepers are stationed at intermediate points, and this process of record is repeated. This record is returned daily to the Traffic Office, and examined with a view to checking the early and late running of the buses and to enquire into the causes. On occasions the running sheets of the conductors, on a given route are also examined for further information. Reports based on this i nformation are sent to the Timing Committee.

The timekeeper's record.

It may be said that it is the practice of the Company to censure drivers arriving at points ahead of their schedule, but subject to a sufficient explanation there is no censure attaching to their being late on the schedule.

In a week in November last a record was made of the number of lost journeys. They numbered 220 out of 85,718, or ·25 per cent. Of these only 17 or ·02 per cent. were attributable to being so late on a trip as to throw the bus out of service, the others were due to breakdown or accident. That is, only in ·02 per cent. of the journeys did the timing break down. Late running uncommon. Lost trips.

The arrangement for closing the working of a route at night is to allow a margin of five minutes beyond the time set out as the last time for a motor-bus to commence a journey from that terminus. Until this margin has expired motor-buses are sent away at the correct service intervals. When it has expired all the remaining motor-buses, if any, are sent into garage. This does not apply to the country routes where the service is infrequent.

III.—Hours of Labour and Conditions of Service.

The present system of arranging shifts of duty and reliefs was introduced in August of last year and is in force on sixty-five routes out of a total of seventy-four. The present system of arranging shifts of duty.

It applies to both drivers and conductors.

The system involves the use of three drivers and three conductors for each two motor-buses on a service. These men work three shifts as follows :—

1. Early shift.
2. Late shift.
3. Relief shift.

The problem of keeping the motor-bus in motion while allowing for the need of rest for the men is solved by allowing each man to undertake only part of the daily work of a bus. Under horse conditions it was a usual practice to allow both man and bus to work the whole day together. The performance of the two factors may be compared in the results for 1912. The average weekly mileage of the motor-bus was 804, and of the driver 417 throughout the year. That is the driver worked only 52 per cent. of the motor-bus mileage, and averaged 60 miles per day. Comparative amount of work done by the motor-buses and the men.

Under the older system the bus was laid up on the stand during the mealtime reliefs of the men. The early and late shift men worked right through in one turn of duty, only the relief shift man changed buses and came off for a long interval. Under this system the lay-over times were 20 to 30 minutes. Under the new system the reliefs are secured by changing the men on the bus while the bus keeps running. That is the difference. The previous system of arranging shifts of duty.

The scheme of shifts and reliefs under this newer system, is explained by the diagram with time cards attached which is included (Exhibit Oa.)

The early shift driver or conductor has to attend at the garage and take out the first motor-bus for service. After working two or more trips, according to their length, he finishes his first turn of duty and is relieved by the late shift man for a meal. After this interval, he takes up the second bus from the relief shift man and works a further two or more trips to finish his second turn of duty, and with it his day's work. The late shift man takes over the second bus from him. The early shift man.

The late shift driver or conductor comes on at a later hour of the day and takes over the first bus from the early shift man, works two or more trips on it, and so finishes his first turn of duty, when he is relieved by the relief shift man for a meal. After the interval, he takes up the second bus from the early shift man, works two or more journeys again, and finishes his second turn of duty by taking this bus back to the garage and completing his day's work. The late shift man.

The relief shift driver or conductor has to attend at the garage and take out the second motor-bus, upon which he works two or more journeys for his first turn of work, when he is relieved by the early shift man. He then waits until the late shift man turns over to him the first bus upon which he works a further two or more trips to complete his second turn of duty. This bus he takes back to garage and completes his day's work. The relief shift man.

This arrangement of shifts and turns of duty may be more easily comprehended from the following table. The numbers show the order in which the turns are worked on each bus.

	First Bus.	Second Bus.
Early Shift Man ...	1. Takes out bus ...	—
	2. First turn of duty	3. Second turn of duty
Late Shift Man ...	3. First turn of duty	4. Second turn of duty
	—	5. Takes in bus
Relief Shift Man ...	—	1. Takes out bus
	—	2. First turn of duty
	4. Second turn of duty	—
	5. Takes in bus ...	—

Each shift therefore includes an approximately equal amount of actual driving work, but the hours of duty of the relief shift driver are not so satisfactory as those of the others on account of the long The Incidence of the shifts on the men equalised.

spread-over in time arising out of the split turn of duty and of the extra labour of both taking out and bringing in a motor-bus. The interval between one turn of duty and the next in his case involves about four hours wait instead of only one. In order to equalise the work of the men, these shifts are allotted to all men in rotation and are changed weekly. Further at the completion of each journey in each direction as a rule and certainly at the completion of each journey to and fro, there is an interval of from 6 to 10 minutes for the convenience of the driver and conductor.

A complete table, showing the mean hours of duty for each shift on an ordinary week-day for every route worked under the new methods is given below.

ORDINARY WEEK-DAY WORKING.

Service No.	Route.	Mean length of Duty. Total spread over time.			Garage Duty.			Mean length of Relief.			Total standing or lay-over time at terminals per motor-bus.
		Early.	Late.	Relief.	Early	Late.	Relief	Early.	Late.	Relief.	
		Hs ms.	Hs. ms.	Hs ms.	Ms.	Ms.	Ms.	Hs ms.	Hs. ms.	Hs. ms	Hs. ms.
1	Kilburn and Tower Bridge	11 34	11 36	14 51	20	20	40	1 4	1 4	3 7	1 7
2	Golder's Green and Ebury Bridge ...	11 4	10 54	14 43	20	20	40	1 22	1 20	2 29	1 37
3	Brixton and Camden Town	10 31	12 6	14 46	20	20	40	57	59	3 12	1 51
4	Finsbury Park and Bermondsey ...	10 30	12 33	15 29	20	20	40	1 13	1 14	3 39	1 26
5	Putney and Stroud Green	12 20	12 35	15 38	20	20	40	1 29	1 34	4 10	1 6
6	Kensal Rise and Victoria Park ...	12 59	12 4	15 44	20	20	40	1 24	1 23	4 17	1 8
6A	Kilburn and Shoreditch	11 51	11 42	15 27	20	20	40	1 20	1 20	2 27	58
7	Liverpool Street and Wormwood Scrubbs	10 47	12 35	15 17	20	20	40	1 22	1 21	3 26	49
8	Willesden and Old Ford	10 31	10 23	15 33	20	20	40	1 30	1 30	1 30	1 30
9	Barnes and Liverpool Street	11 33	11 25	15 45	20	20	40	1 7	1 15	4 21	1 8
9A	Barnes and Piccadilly Circus ...	10 25	10 53	15 21	20	20	40	54	41	3 12	1 45
10	Wanstead and Elephant and Castle ...	10 57	13 20	13 50	20	20	40	1 17	1 16	3 3	1 15
11	Hammersmith and Liverpool Street	11 15	12 35	14 58	20	20	40	1 30	1 30	3 29	1 13
11A	Wormwood Scrubbs and Liverpool Street	11 35	11 58	14 6	20	20	40	1 26	1 24	3 40	1 4
12	Turnham Green and Peckham Rye ...	9 33	12 38	15 14	20	20	40	1 48	1 48	1 48	1 48
13	Hendon and London Bridge Station	11 6	12 23	14 14	20	20	40	1 32	1 32	4 14	50
14	Putney and Hornsey Rise	12 50	12 43	15 29	20	20	40	1 43	1 43	4 2	1 8
15	Putney Common and East Ham ...	9 39	12 48	15 10	20	20	40	1 26	1 19	2 57	1 24
16	Cricklewood and Victoria	12 20	12 13	15 21	20	20	40	1 24	1 20	4 1	56
17	Ealing and London Bridge	12 38	12 51	15 48	20	20	40	1 26	1 26	4 18	1 4
18	Willesden and London Bridge ...	12 20	12 24	15 24	20	20	40	1 32	1 35	4 17	1 8
19	Clapham Junction and Highbury ...	11 8	13 19	15 34	20	20	40	1 33	1 33	3 9	56
20	Shepherd's Bush and West Norwood	9 35	12 25	13 24	20	20	40	1 17	1 13	1 41	1 3
21	Wood Green and Greenwich	11 4	11 37	15 53	20	20	40	1 16	1 16	2 56	59
22	Putney and Homerton	11 49	11 48	15 9	20	20	40	1 45	1 45	5 4	58
23	Acton Vale and Barking	10 11	11 30	14 27	20	20	40	1 30	1 30	1 30	1 30
24	Hampstead Heath and Pimlico ...	10 35	12 49	15 50	20	20	40	56	1 16	2 49	1 58
25	Seven Kings and Victoria	10 25	11 38	15 39	20	20	40	1 13	1 13	1 13	1 13
26	Kensal Rise and Hackney	10 56	13 30	15 25	20	20	40	1 47	1 44	4 30	1 15
27	Twickenham and Highgate	8 57	12 32	14 33	20	20	40	1 17	1 16	2 43	51
28	Wandsworth and Golder's Green ...	10 12	12 18	15 3	20	20	40	1 11	1 10	3 21	1 20
29	Victoria and Southgate	12 27	12 14	15 29	20	20	40	1 21	1 22	4 1	1 3
30	Putney and King's Cross	10 35	12 24	15 19	20	20	40	1 12	1 11	3 27	1 27
31	Chelsea and Swiss Cottage	10 46	11 18	14 26	20	20	40	1 1	1 1	3 43	1 38
32	Ladbroke Grove and Charing Cross ...	10 54	12 52	15 26	20	20	40	50	50	5 11	1 56
33	East Sheen and Liverpool Street ...	9 19	11 59	14 52	20	20	40	49	49	2 6	1 59
34	West Norwood and Liverpool Street	11 29	11 38	15 12	20	20	40	1 2	1 3	4 35	1 38
35	Walthamstow and Elephant and Castle	10 47	12 58	15 35	20	20	40	1 11	1 11	3 51	51
35A	Walthamstow and Elephant and Castle	10 46	12 57	15 37	20	20	40	1 10	1 10	3 31	52
36	West Kilburn and Catford	11 2	11 30	15 45	20	20	40	1 57	1 57	1 57	1 57
37	Herne Hill and Hounslow	8 20	12 15	14 54	20	20	40	1 3	1 3	2 19	1 1
38	Leyton and Victoria	12 2	11 52	14 12	20	20	40	1 55	1 55	3 52	1 37
39	Victoria and Sidcup	9 22	12 33	15 40	20	20	40	1 38	1 38	1 38	1 38
40	Elephant and Castle and Upton Park	10 26	12 47	15 19	20	20	40	1 24	1 25	3 44	1 45
41	Tufnell Park and Old Ford	10 15	12 18	14 54	20	20	40	1 15	1 15	3 30	1 32
42	Finsbury Park and Tower Bridge ...	10 30	12 4	14 42	20	20	40	1 1	1 1	2 57	1 12
43	Muswell Hill and London Bridge ...	11 19	12 32	15 18	20	20	40	51	51	3 21	1 15
44	Putney Common and Highbury ...	12 5	11 54	15 36	20	20	40	1 7	1 8	4 24	1 6
45	Clapham Common and Swiss Cottage	11 53	11 56	15 23	20	20	40	1 15	1 15	4 14	1 48
46	Willesden and Victoria	9 18	11 12	15 33	20	20	40	1 11	1 10	3 13	1 30
48	Tottenham and Merton	9 49	12 32	15 7	20	20	40	1 31	1 21	3 10	57
49	Shepherd's Bush and Streatham ...	10 46	11 50	15 34	20	20	40	1 15	1 15	3 45	1 0
50	Shepherd's Bush and Liverpool Street	11 29	10 55	15 41	20	20	40	1 12	1 12	3 18	1 22
59	Oxford Circus and Croydon	11 12	12 59	14 52	20	20	40	1 31	1 31	3 45	1 14
62	Highgate and Waterloo	10 38	11 12	14 42	20	20	40	52	50	3 42	1 49
65	Fulham and Stoke Newington ...	12 19	12 14	15 29	20	20	40	1 22	1 23	4 1	56
66	Tooting and Willesden	11 35	12 17	15 10	20	20	40	1 24	1 24	4 2	1 17
67	Leyton and Poplar	11 30	11 35	14 24	20	20	40	1 20	1 20	3 50	1 25
68	Camberwell and Chalk Farm ...	11 5	11 18	14 45	20	20	40	1 0	1 0	4 17	2 28
69	Poplar and Plumstead	9 59	11 29	15 46	20	20	40	49	48	3 37	2 28
71	Ealing and Surbiton	9 13	12 11	14 58	20	20	40	2 41	1 18	2 10	1 36
74	Barnes and Camden Town	10 47	10 55	15 13	20	20	40	1 8	1 8	3 4	1 22
76	Stoke Newington and Victoria ...	11 12	11 3	15 21	20	20	40	1 7	1 7	2 53	1 1
77	East Hill and King's Cross	11 19	11 19	15 48	20	20	40	1 4	1 4	3 2	1 20
83	Golder's Green and Kilburn	10 51	11 33	15 44	20	20	40	48	1 2	3 4	1 35
87	Colney Hatch and Clapton	11 4	11 35	14 35	20	20	40	1 1	57	3 29	1 36
93	Mile End and Romford	10 53	11 35	15 48	20	20	40	1 10	1 10	3 30	54

The average length of the early shift is 11 hours, of the late shift 12 hours and of the relief shift $15\frac{1}{4}$ hours, of which $9\frac{3}{4}$ hours are actually spent in driving. The average driving time of early and late shifts is approximately 9 hours. The spread over time includes the time spent in the garage prior to and upon completion of a day's work and the time of all reliefs. It represents the full time a man is on duty.

Actual driving hours of the Shifts.

Owing to variation in the length of shifts an average figure is to some extent misleading. The table printed below shows, for the regular shifts grouped according to their length, the percentage each group is to the total.

ORDINARY WEEKDAY WORKING.

Length of Shifts	Early Shift.	Late Shift.	Relief Shift.	Total.
	Per cent. of Total.	Per cent. of Total.	Per cent. of Total.	Per cent. of Total.
HOURS.				
Under 8	4	$\frac{1}{2}$	—	1
8 — $8\frac{1}{2}$ ...	1	$\frac{1}{2}$	—	$\frac{1}{2}$
$8\frac{1}{2}$— 9 ...	2	—	—	$\frac{1}{2}$
9 — $9\frac{1}{2}$ ...	6	$\frac{1}{2}$	—	2
$9\frac{1}{2}$—10 ...	7	—	—	2
10 —$10\frac{1}{2}$ ...	11	4	—	5
$10\frac{1}{2}$—11 ...	23	6	—	10
11 —$11\frac{1}{2}$ ...	19	15	—	12
$11\frac{1}{2}$—12 ...	10	19	—	10
12 —$12\frac{1}{2}$ ...	10	25	—	12
$12\frac{1}{2}$—13 ...	6	20	$\frac{1}{2}$	9
13 —$13\frac{1}{2}$ ...	1	5	$3\frac{1}{2}$	3
$13\frac{1}{2}$—14 ...	—	3	3	2
14 —$14\frac{1}{2}$ ...	—	1	7	3
$14\frac{1}{2}$—15 ...	—	$\frac{1}{2}$	21	7
Over 15 but under 16	—	—	65	21
Total ...	100	100	100	100

Sunday working.

The method of arranging the hours of duty on Sundays differs from that employed on week-days. The Sunday duty is not so tiring as the week-day duty, and the men are well pleased with the arrangement which provides for a long day on Sundays, and provides for the necessary relief with a longer lay over at terminals.

The Sunday shift is of practically uniform length for all men working on one route. The buses required for the route leave the garage at stated intervals, so that the full service for the route is built up gradually by mid-day. The first half of the buses leaving a garage for a given route constitute, as it were, the early shift; the second half the late shift. Each pair of drivers and conductors remain with their bus the whole day, and the first to go out in the morning is the first to come in in the evening.

The Sunday working is summarized in the table printed below.

SUNDAY WORKING.

Service No.	Route.	Mean Length of Duty.		Garage Duty.	Relief or Lay-over Time of Motor-bus and Men.		Remarks.
		H.	M.	M.	H.	M.	
1	Edgware and Tower Bridge	14	16	40	2	2	
2	Ebury Bridge and North Finchley	15	12	40	2	9	
4	Finsbury Park and Bermondsey	14	59	40	2	5	
5	Putney and Stroud Green	14	43	40	1	58	
6	Kensal Rise and South Hackney	14	37	40	2	0	
6a	Kilburn and Shoreditch	13	45	40	2	33	
7	Liverpool Street and Wormwood Scrubbs ...	14	10	40	2	30	
8	Willesden and Old Ford	14	20	40	2	2	
9	Barnes and Liverpool Street	13	59	40	2	8	
10	Elephant and Castle and Wanstead	14	57	40	2	18	
11a	Wormwood Scrubbs and Liverpool Street ..	12	48	40	1	50	
12	Turnham Green and Peckham Rye	14	58	40	1	28	
14	Putney and Hornsey Rise	14	55	40	2	15	
15	Putney and Plaistow	15	5	40	1	43	
16	Cricklewood and Victoria	14	0	40	1	12	Worked with reliefs
17	Ealing and East Ham	14	46	40	2	33	
18	Willesden and London Bridge...	14	20	40	2	20	
19	Clapham Junction and Highbury Barn ...	11	45	40		58	Worked with reliefs
20	Shepherds Bush and Norwood	14	56	40	1	36	
21	Wood Green and Tunnel Avenue	14	4	40	2	9	
23	Marble Arch and Ripplesde	14	18	40	1	46	
24	Pimlico and Hampstead	14	31	40	1	31	Worked with reliefs
25	Victoria and Seven Kings	14	44	40	2	12	
26	Kensal Rise and Hackney	15	28	40	1	54	
27	Highgate and Twickenham	12	40	40	1	35	
28	Golders Green and Wandsworth Bridge ...	14	52	40	1	32	Worked with reliefs
29	Southgate and Victoria	14	20	40	1	47	
29	Cockfosters and Victoria	13	40	40	1	40	
30	King's Cross and Kingston	14	12	40	1	53	
31	Chelsea and St. John's Wood	13	43	40	2	18	
33	East Sheen and Piccadilly Circus	12	9	40		33	Worked with reliefs
35	Elephant and Castle and Chingford	15	0	40	1	57	
35a	Elephant and Castle and Wood Street ...	14	7	40	2	3	
36	West Kilburn and Catford	14	54	40	1	25	
37	Hounslow and Herne Hill	14	31	40	2	16	
38	Victoria and Epping Forest	13	35	40	1	23	
39	Victoria and Sidcup	12	48	40	1	24	
40	Upton Park and Elephant	14	22	40	2	18	
42	Finsbury Park and Tower Bridge	13	33	40	2	25	Worked with reliefs
43	Muswell Hill and London Bridge	14	17	40	2	2	Worked with reliefs
44	Putney and Highbury...	14	53	40	1	5	Worked with reliefs
45	Clapham Common and St. John's Wood ...	14	28	40	2	14	
46	Willesden and Victoria	13	22	40	2	18	
48	Tottenham and Merton	13	43	40	1	59	
49	Shepherds Bush and Thornton Heath ...	13	14	40	1	38	
59	Camden Town and Croydon	14	1	40	1	30	
65	Stoke Newington and Fulham	14	52	40	1	55	

SUNDAY WORKING—*continued.*

Service No.	Route.	Mean Length of Duty.		Garage Duty.	Relief or Lay-over Time of Motor-bus and Men.		Remarks.
		H.	M.	M.	H.	M.	
66	Willesden and Tooting	14	29	40	2	9	
67	Walthamstow and Blackwall Tunnel... ...	11	47	40		52	Worked with reliefs
68	Chalk Farm and Tulse Hill	14	28	40	1	10	Worked with reliefs
69	Poplar and Plumstead	14	16	40	2	13	Worked with reliefs
71	Ealing Broadway and Surbiton	11	35	40		39	Worked with reliefs
74	Camden Town and Barnes	13	52	40	2	40	Worked with reliefs
77	Earlsfield and King's Cross	14	6	40	2	49	
79	Kingston and Esher	10	47	40		49	Worked with reliefs
80	Ealing and Northfields	14	16	40		33	Worked with reliefs
81	Hounslow and Windsor	14	25	40	1	0	Worked with reliefs
82	Heston, Hounslow and Staines	9	4	40		48	Double shift
83	Golders Green and Edgware	11	3	40	1	19	Worked with reliefs
84	Golders Green and St. Albans	10	47	40		25	Worked with reliefs
85	Putney Bridge and Kingston	14	18	40	3	4	
86	Barking and Barkingside	11	55	40		46	Worked with reliefs
87	Clapton and Colney Hatch Lane	13	51	40	1	23	Worked with reliefs
93	Burdett Road and Romford	12	24	40	2	10	
100	Stockwell and Whyteleafe	13	22	40	1	36	
101	Somerset House and Hampton Court ...	14	21	40	1	32	
102	Charing Cross and Harrow Weald	12	50	40	1	36	
103	Buckhurst Hill and Elephant and Castle ...	14	17	40	1	33	
104	Somerset House and Hampton Court... ...	14	37	40	1	57	
105	Kilburn and Watford	13	11	40	1	39	
106	Oxford Circus and Petersham	13	3	40	1	59	
108	Elephant and Castle and Epping	14	33	40	1	19	
109	Golders Green and Hatfield	10	55	40		58	Worked with reliefs
107	Clapham Common and Epsom	12	7	40	1	48	

Methods of ensuring rest periods between the shifts.

It is to be noted that the early shift drivers and conductors for the following Monday are not allowed to work on the preceding Sunday. The effect of this rule is to enforce one day's rest in three weeks owing to the rotation of shifts. It is optional on the men to take more, and it is usual for them to take the days on which their bus is in dock. That is one day in fourteen. A further effect is that there is adequate rest for the men in changing over the different shifts worked. Further, the relief shift men on Monday are only drawn from those resting the previous Sunday, or working the first half of the buses engaged in the Sunday service.

Spare men.

The next point in connection with the conditions of employment is the spare men. Experience has shown that a fairly large per centage of spare men is required to secure the satisfactory fulfilment of all the turns of duty.

Need for spare men.

The necessity for spare men or men in excess of the number of daily turns of duty available arises from the following causes :—

1. The provision of a rest day in each week for each man.

The taking of a rest day is not compulsory except as stated above.

2. The covering up of absence in case of sickness, lateness in taking up duty and abstention from duty.

Men earning high wages are inclined to take a holiday.

3. The enforced absence of men on account of suspension or other disciplinary measures.

4. The provision of additional motor-buses in an emergency or on occasions of special traffic.

5. The covering of developments in business with men of some experience.

The spare men are usually those most recently engaged and of the lowest class in the grade.

Allocation of work to spare men.

The spare men take up shifts of duty in turn, and the man employed one day has to wait for his next day's employment until each other spare man has had his opportunity. The average figures given in Part III., Sections 3 and 6, show that this does not always mean the waiting of a whole day as a general custom.

The spare men are divided into two rosters, one for the early and relief shifts, the other for the late shift. This prevents a man working an early shift in immediate succession to a late shift and secures an adequate interval of rest. The balance of each roster not securing work on one day stand at the head of the list for the next day.

The spare men work exactly the same shifts of duty that the regular men do. The spare men merely take the place of the regular men for certain shifts owing to the absence of the regular man for some cause.

It is the duty of the spare man to report himself at the garage to which he is attached 30 minutes before the time appointed for the first bus to leave, for which he might be called upon to work under the roster.

Actual conditions prevailing for a given week.

The following statistics for the week ending December 18th, 1912, illustrate the situation :—

Average number of motor-buses in daily service ... 2193

	Drivers.	Conductors.
Total number of men employed	3888	3888
Average number spare each day	777	828
Average number at work each day	3060	3060
Average number of days' work per man per week	5·48	5·38
Mean rate of wages	£2 6 6	£1 13 6

Wages of the spare men and regular men compared.

A mean figure is not quite a satisfactory statistic to illustrate a point of this kind, and in order to show the variation round the mean rate of wages, particulars are given for a more recent week, indicating by groups the actual wages paid to each man and distinguishing between the regular and the spare men.

Amount earned.	Week ending 22nd January, 1913. Regular Drivers.	Per cent. of total.	Spare Drivers.	Per cent. of total.
Not working	149	4·5	18	2·7
Under 10/–	68	2·0	21	3·1
From 10/– to 14/11 ...	27	·8	15	2·2
From 15/– to 19/11 ...	44	1·3	19	2·8
Under £1	288	8·6	73	10·8
From £1 to 24/11 ...	57	1 7	26	3·9
From 25/– to 29/11 ...	103	3·1	44	5·6
From 30/– to 34/11 ..	179	5·4	86	12·8
From 35/– to 39/11 ...	289	8·7	88	13·1
From £2 to 44/11 ..	449	13·5	115	17·2
From 45/– to 49/11 ...	605	18·2	99	14·8
From 50/– to 54/11 ...	529	15·9	85	12·7
From 55/– to 59/11 ...	448	13·5	37	5·5
From £3 to 64/11 ...	238	7·1	13	1·9
From 65/– to 69/11 ...	109	3·3	3	·4
Over 70/–	32	1 0	2	·3
TOTAL	3,326	100	671	100

The wages under £1 would be due to sickness or absence from work for other causes.

In order to illustrate more fully the position of the spare men particulars have been taken out for four representative garages where the services working out of them are completely developed. The results are as follows :—

Examples of work done by spare men.

Garage.	Total No. of Men employed.	No. Spare	Percent. of Total.	Average No. of days worked.	Average Weekly Wage.
Drivers.					
Turnham Green ...	184	20	11	3·70	£1 5 10
Old Kent Road ...	214	44	20	5·45	2 2 7
Albany Street ...	116	13	11	5·38	1 19 9
Dalston	187	35	19	4·68	1 13 4
Conductors.					
Turnham Green ...	146	33	22	5·09	1 7 2
Old Kent Road ..	174	43	24	5·24	1 8 11
Albany Street ...	92	20	21	5·46	1 7 6
Dalston	167	24	14	5·32	1 6 6

Time spent in garage.

A third point in connection with the conditions of employment is the garage time. Each driver taking a motor-bus out of a garage has to carry out a certain preliminary inspection to satisfy himself that it is in a fit condition to take the road. Each driver is required to present himself for duty at his garage not less than 20 minutes before the time booked for his departure on service in order to satisfactorily perform these routine duties prior to this departure. On the completion of a day's work, a driver returning a motor-bus to the garage has a report to prepare on the condition of the engine and on other material points, as a guide to the garage staff in carrying out the inspection of the motor-bus in the night between one day's service and the next. This duty occupies about fifteen to twenty minutes.

The motor-bus has also to be filled with supplies of petrol and water. Some of the drivers giving evidence before this Committee complained of the time occupied in this work. These complaints arose at particular garages where for some reason the equipment was temporarily inadequate. There is no permanent source of complaint under this head.

Conductors have also duties at the garage at the commencement and completion of the actual day's work, but they have only slight bearing upon the question of the public safety, except it be in the making out of reports of accidents in which they are concerned, or in which the company is concerned, and of which they are the witnesses.

END OF
TITLE